

CLAUSE J.1, ATTACHMENT A
PERFORMANCE WORK STATEMENT
FOR
HEADQUARTERS INFORMATION TECHNOLOGY SUPPORT SERVICES
(HITSS) III

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NASA Headquarters
Information Technology and Communications Division (ITCD)

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Part 1

General Information and Requirements

1.0 General

The Chief Information Officer in the NASA Headquarters Information Technology and Communications Division (ITCD) is providing this Performance Work Statement (PWS) on behalf of NASA Headquarters. The purpose of this Performance Work Statement is to provide a framework for information technology support services for ITCD and other NASA Headquarters organizations such as Administrator Staff Offices, the Chief Information Officer (OCIO), Mission Directorates, JPL NASA Management Office, and Mission Support Directorate.

The mission of NASA Headquarters (HQ) is to provide overall guidance and direction to the Agency. NASA HQ is organized into four Mission Directorates (Aeronautics, Human Exploration and Operations, Science, and Space Technology), the Mission Support Directorate, and several Administrator Staff Offices, including the Chief Financial Officer, Chief Information Officer, Chief Technologist, of General Counsel, and Chief Engineer.

The mission of ITCD is to support NASA HQ and the Agency by providing quality IT services, enabling HQ Mission Directorates, the Mission Support Directorate, and Administrator Staff Offices as well as Agency and NASA Center programs to accomplish NASA's mission. ITCD's vision is to deliver reliable, innovative and respected IT solutions. Its key organizational values are integrity, responsibility, helpfulness, effectiveness, and collaboration. As the Agency is moving forward with the NASA IT Infrastructure Integration Program (I³P), and Agency strategic sourcing initiatives, collaboration and integration of multiple services provided by multiple service providers is of special importance.

The contractor shall provide all personnel, equipment, supplies, facilities, transportation, tools, materials, supervision, and other items and services necessary to perform IT services and support as defined in this Performance Work Statement except for those items specified as government furnished property and services. The contractor shall perform to the standards in this contract and federal and IT industry standards.

The HQ IT Support Services (HITSS) Contractor shall:

- a. Provide expert support and value-added guidance in developing cost effective solutions for IT requirements driven by but not limited to federal and Agency mandates, NASA missions and programs, and operations;
- b. Provide an IT infrastructure, a technical architecture, a data architecture, a business architecture, an IT service integration architecture that fosters development of IT systems, technology platforms, IT services and technical capabilities in a robust, innovative, and evolving environment and takes full advantage of industry standards and emerging technologies;
- c. Perform data management services for HQ;
- d. Operate the NASA HQ data center environments in an efficient and effective manner;

- e. Management of the NASA Headquarters Managed Computing Environment in the Agency's Cloud Infrastructure Program;
- f. Support IT requirements that utilize specialized IT skills and knowledge of technology trends to significantly increase user productivity and efficiency;
- g. Support IT requirements that utilize specialized IT skills, knowledge, and analytics to significantly contribute to, support, and affect effective IT management, IT operations, service management and integration, planning and delivery;
- h. Support IT portfolio management to ensure support stewardship of IT investments;
- i. Provide and support project management in support of HQ and Agency initiatives;
- j. Provide outreach, communications, and excellent customer service for a variety of IT disciplines and functional areas;
- k. Incorporate IT security in all aspects of the work to ensure protection of NASA Headquarters' data and systems, Agency data and systems, and in support of NASA Centers' data and systems;
- l. Provide support for maintenance and management of ITCD's governance model and structure, Information Technology Infrastructure Library (ITIL) framework, ITIL service strategy, definition, design, and standards, ITIL service transition, ITIL operations, and continuous improvement;
- m. Provide, manage, maintain, track, and report all equipment associated with HQ IT systems and services;
- n. Track and report HQ assets (GFE);
- o. Provide support for HQ Asset Management Processes;
- p. Provide web services, to include public-facing website hosting and applications;
- q. Provide Knowledge Management services and assist in the management of ITCD's, HQ's, and the Agency's Knowledge Management programs;
- r. Effectively collaborate with all stakeholders such as Headquarters, NASA Center, OCIO, and Agency IT Contractors to provide seamless integration of services to ITCD, NASA Centers, the OCIO, and the Agency; and
- s. Ensure that all IT activities meet all applicable Federal, OMB, OPM, Agency, and Headquarters requirements.

The specific support services required under this contract include: planning and management of information systems, technical solutions & capabilities; Cloud Services; Application, Web, Business, Data, and Technical Architecture services; Lifecycle Management of Technical and IT Process Implementation; Systems Engineering and Integration services; Supply Chain Risk Management; Continuity of Operations (COOP); Operation of the NASA HQ Data Center; ITIL Services Strategy, Definition, Design, and Standards; ITIL Service Management; ITIL Service Management and Operations; ITIL Continuous Improvement; IT and Information Security; Technology Innovation and Infusion; Emerging Technology; IT Portfolio Management; Asset Management; Project Management and Integration services; Customer Service and Help Desk; Knowledge Management; IT Training; and

support for approved NASA desktops, laptops, integration of HQ services into the Agency-wide Active Directory, e-mail and calendaring functionality.

Below are services provided through the NASA I³P initiative or strategic sourcing initiatives, and the NASA Shared Services Center (NSSC). The HITSS Contractor shall collaborate and integrate with, supplement and/or augment the I³P Contractors, if necessary, as well as the NSSC Contractor providing NASA-wide Enterprise Service Desk (ESD) and Enterprise Service Request System (ESRS) services. A high-level view of the I³P acquisitions or strategic sourcing initiatives include the following enterprise services: ;

- NICS (NASA Integrated Communications Services): Communications Services – to include data, voice, video, LAN and WAN services;
- ACES (Agency Consolidated End-user Services): End-User Services – to include NASA ACES desktops, laptops, cell phones, smartphones, Agency-wide Active Directory, e-mail and calendaring functionality;
- WESTPrime (Web Enterprise Service Technologies Prime): Web Services – to include public-facing website hosting and applications; and,
- EAST 2 (Enterprise Applications Service Technologies): Enterprise Applications Services – to include applications services associated with the NASA Enterprise Applications Competency Center and Agency-wide collaboration services including NASA's Identity, Credentialing, and Access Management (ICAM) in addition to new intranet environments and applications.
- Networx and Enterprise Infrastructure (EIS) contracts
- NASA Enterprise Licenses Management Team (ELMT) For the acquisition of Enterprise software licenses and services

This PWS represents a set of core requirements that are provided to all HQ offices in the areas of program management; program-wide services; customer service and customer relationship management; application, web, business architecture, technical architecture, data architecture, and data management services; NASA HQ Data Center and Cloud Services support; ITIL services and support; systems engineering, integration, and implementation services; Knowledge Management; IT security; Asset Management; Project Management and Integration services; and the Emerging Technology program. Other program or organizational unique related services may be required during the life of the contract to provide direct support to Mission Directorates and Mission Support Directorate in the areas of dedicated system development and/or subject matter expert support. These other services will be ordered through the Indefinite Delivery Indefinite Quantity (IDIQ) portion of the contract. Metrics, Service Level Agreements (SLAs), Operational Level Agreements (OLAs), Key Performance Indicators (KPIs), and other measurements contained in this PWS will be used in conjunction with standards, policies, requirements, regulations, incentive fee metrics and measurements to determine the performance of the contractor.

2.0 Program Management

Effective program management is the cornerstone of successful contract execution. The Contractor shall be responsible and accountable for ensuring the quality and timeliness of products and services delivered

under this contract. This requires technical expertise and the ability to establish technical credibility with all stakeholders such as ITCD, Mission Directorates, Administrator Staff Offices, the OCIO, and the NASA Centers. However, good program management also includes, but is not limited to, the following characteristics:

Leadership – The Contractor’s program management team shall lead its team by example toward the successful accomplishment of its mission, despite the problems that any program/project will encounter. Leadership implies more than managerial skills. It includes looking ahead to see the big picture, strategic planning for changes in the technical landscape, anticipating potential problems, resolving them as quickly as possible, and providing the environment that enables the team to be successful. Commitment to excellence and respect for team members and partners are strong elements of leadership.

Communications – The Contractor is responsible for doing its part to facilitate productive communications among all parties, including the Government, customers, and other service providers.

Lessons Learned – Identifying, documenting, and managing lessons learned to ensure a knowledge base from which transparency of positive and negative service and support activities as well as continuous improvement of services can be achieved.

Managing Relationships – Building and maintaining effective relationships with stakeholders is critical to success of this program. Stakeholders include ITCD staff and management, Mission Directorates and Administrator Staff, the OCIO, other NASA Centers, and other service providers such as the Agency’s strategic sourcing contractors that depend on services performed under this contract.

On -Time Delivery of Quality Services and Support – A consistent delivery of services and support that meet customer expectations, quality standards, technical requirements, and schedule needs is essential to establishing and retaining credibility as a service provider.

Reporting – A strong reporting capability and framework provides visibility into the program and supports communication with the stakeholders as well as within the service provider’s staff. This is essential for corrective actions, support of lessons learned, risk management, and successful delivery.

Teambuilding – A strong, integrated Government-Contractor team is supportive and proactive. Good program management includes strategies to keep the team together and working toward mutual goals.

Institutional Support – Although technical expertise is important, a strong organization with access to resources for staffing and budgeting is a critical component of effective program management.

2.0.1a Background

HQ ITCD’s program management structure consists of program integration services (includes contract management, governance, SLA management, metric definition and management, and portfolio management), Knowledge Management, Asset Management, ITIL, Lifecycle Management (including agile and iterative delivery/deployment), Project Management and Project Integration, and Financial Management. The contractor shall provide data and provide services and support required to maintain these core functions of ITCD operations and program management. The requirements outlined in section 2.0 and sub-sections define the services, support, data, information, and knowledge essential to success of ITCD’s program management functions and processes.

2.0.1b Program Certifications

HQ ITCD requires the contractor to have the following certifications prior to award of the contract:

- Capability Maturity Model Integration (CMMI) Level 3 (in application/software development and engineering, data center and cloud operations/services, configuration management, testing, systems engineering, and estimation of work).
- Lean Six Sigma (required for Service Improvement, Standards, Metrics, and Requirements Development and Management services and support)
- Information Technology Infrastructure Library (ITIL) (version considered current by industry at the time of contract award)

For the purpose of compliance with certification requirements, the contractor (prime and/or subcontractors to the prime) shall have the certifications indicated above. Furthermore, the contractor (prime and/or subcontractors to the prime) performing work in the service areas, for which certifications are required, shall have possess the certification(s) required for those service areas.

HQ ITCD's program management structure consists of program integration services (includes contract management, governance, SLA management, metric definition and management, and portfolio management), Knowledge Management, Asset Management, ITIL, Lifecycle Management (including agile and iterative delivery/deployment), Project Management and Project Integration, and Financial Management. The contractor shall be required to provide data and provide services and support required to maintain these core functions of ITCD operations and program management.

2.1 Program Management Reports and Reviews

A goal for the ITCD and HITSS team is for management and staff to be aware of program/project status on a continuous basis facilitated by precise, accurate, and timely reporting and reviews. In addition to face-to-face meetings, the Contractor shall provide and promote online postings of current knowledge products in an orderly and intuitive manner and minimize the need to generate and email products for distribution. The success of this service should minimize issues of versioning, multiple email attachments and enable meetings to focus more on details of status, issues, initiatives, and opportunities. To support specific meeting requirements the Contractor shall:

- a. Provision scheduling, invitation lists, and accurate documentation of minutes and actions;
- b. Plan, operate and support daily operational status to brief the team on previous day's issues/status and current day's plans, review of escalated Work Requests, status of critical operational issues;
- c. Plan, operate and support weekly Configuration Control Board (CCB) meetings to review deployment packages and infrastructure change request packages;
- d. Plan, operate and support daily Functional Change Control Board (FCB) to review and disposition new Work Requests, proposed change requests and work requests for applications, services, infrastructure, architecture, and systems, issues of cross-Contractor or cross-service support and functions;
- e. Plan, operate and support weekly Preliminary Design Reviews (PDR), Critical Design Reviews (CDR), and Operational Readiness Reviews (ORR) status;

- f. Plan, operate, and support weekly Program and Project Management Review Board (PMRB/PMR) for review and vetting of potential IT investments, for proposed service changes, for Agency and federal mandates, for potential projects, and other IT related initiatives and requests;
- g. Plan, operate, and support monthly program meetings, and other forums/reviews as required to ensure focus on specific issues requiring leadership attention and coordination such as project risk versus planned, priority adjustment requests and analysis, outstanding critical project or program issues.

Data Requirements Documents (DRD)	Description	Frequency
DRD 2-1-1	Contract Status Meeting	Monthly – no later than last week of the month
DRD 2-1-2	PMRB/PMR Meeting	Weekly
DRD 2-1-3	CCB	Weekly
DRD 2-1-4	FCB	Daily
DRD 2-1-5	Gate Review Meetings	Weekly
DRD 2-1-6	Operational Status	Daily

2.2 Metrics, Reporting, and Analytics

Metrics, reporting and analytics are vital to IT Management, portfolio management, ITIL execution, service management, risk management, IT operations, and continuous improvement. The objective of services and support that the Contractor shall provide to ITCD in support of defining, documenting, managing, maintaining, reporting, and analyzing metrics, reports, and other data is to establish effective oversight of information technology processes, assets/artifacts/resources, delivery, management, and operations for the program. It is essential the Contractor have an established metrics and statistical analysis competency for the success of these requirements and business needs.

2.2.1 Metrics Definition and Metrics Management

The Contractor shall collect data, define and implement processes and systems, and enhance ITCD's metric framework, metric methodology, and metric management for ITCD's operational management, IT management, and program management to include (but not limited to) the following:

- Earned Value Management
- Project Management
- Knowledge Management
- Financial Reporting and estimation at the program level, project level, work request level, sprint level, release level, service level. (cost and hours)
- Portfolio Management
- Metrics Definition and Metrics Management
- Quality Assurance
- Transition Planning and Execution
- IT Service Management
- ITIL Service Strategy, Definition, Design, and Standards

- Risk Management
- Software and Web Development, Systems Engineering & Implementation, and Technology Management Lifecycles
- Compliance
- ITIL Lifecycles, Processes, and Functions
- Enterprise Architecture (Data Architecture, Technical Architecture, Business/Program-Level Architecture)
- Customer Relationship Management and Customer Service Lifecycle and Processes
- Capacity Planning
- Demand Management
- Information Security
- Technical Skill Management and Technical Competency Management

DRD	Description	Frequency
DRD 2-2-1-1	<p>Metrics Data & Metric Status Report: Definition, collection, review, assessment, evaluation, management, maintenance, and enhancement of metrics and analytics for ITCD's metric framework, metric methodology, and metric management for ITCD's operational management, IT management, and program management. Report must include (but not limited) the following metrics:</p> <ul style="list-style-type: none"> •Earned Value Management •Project Management •Knowledge Management •Financial Reporting and estimation at the program level, project level, work request level, sprint level, release level, service level(cost and hours) •Portfolio Management •Metrics Definition and Metrics Management •Quality Assurance •Transition Planning and Execution •IT Service Management 	Updated and available weekly during the first three months of contract start date; enhancements and additional content added monthly thereafter

DRD	Description	Frequency
	<ul style="list-style-type: none"> •ITIL Service Strategy, Definition, Design, and Standards •Risk Management •Software and Web Development, Systems Engineering & Implementation, and Technology Management Lifecycles •Compliance •ITIL Lifecycles, Processes, and Functions •Enterprise Architecture (Data Architecture, Technical Architecture, Business/Program-Level Architecture) •Customer Relationship Management and Customer Service Lifecycle and Processes •Capacity Planning •Demand Management •Information Security •Technical Skill Management and Technical Competency Management 	

2.2.2 Reporting

2.2.2.1 HQ ITCD Performance Management

The Contractor shall leverage opportunities for collaboration and shall satisfy all stated deliverables and metrics that are identified throughout this PWS. The Government requires minimizing the submission of paper documents during this contract and maximizing the online discovery of and relationship between documentation, configuration items, financial information, program data, project data, work request data, service level data, inventory, assets, plans, metrics, process and standards, resources, and analytical artifacts. The Contractor shall assess, enhance, establish, provide, and manage an online environment that achieves the following goals:

- a. Provides a secure site for Contractor, ITCD, and other HITSS stakeholders to collaborate in the execution of HITSS activities and to develop products. Content posted to the site shall include linkages to and between related deliverables and supporting artifacts, outage notifications, training documentation, technical documentation, task order documentation, financial data, estimation data, schedule data, risk data, project management data, data that supports ITCD's ITIL framework/service management/standards/strategy/operations, data architecture, technical architecture, and business architecture, actual cost data, ITCD's IT Portfolio, security plans, baselined inventory, standard procedures, as-built drawings, configuration items/artifacts, assets, resources, processes, guidelines and DRDs (Data Requirements Documents);
- b. Leverages existent authoritative data sources such as but not limited to STRAW, ITSEC-EDW, IDAMS, Solarwinds, Nagios, server logs, and configuration management databases (e.g. the application portfolio, application code repository, vm and server configuration baselines, RAM (Rational Asset Manager), procedural repositories (e.g. SOPR (Standard Operating Procedures Repository)), RAM (Rational Asset Manager), work management systems (e.g. WRIS (the Work Request In-Take System), WMS (the Work Management System), RTC (Rational Team Concert)), lifecycle management (e.g. Rational CLM and other supporting lifecycle management tools), CCB tools (e.g. the RTC Change Request Module), the project management and portfolio management system (e.g. the HQ Project and Portfolio Management System (HQPPMS));
- c. Establishes technical approaches, procedures, standards and mechanisms to ingest new authoritative data sources in to the HQ ITCD Business Intelligence (HQBI) service;
- d. Ensures visibility, at varying levels as appropriate, to project plans and management activities, including schedule, actual costs, actual hours, estimated costs, estimated hours, resources, milestones, and trending sufficient to discuss alternatives or priority tradeoffs;
- e. Contains current information as well as history of key areas to determine risks, mitigations and areas for improvement;
- f. Can be leveraged as the environment to ingest data from authoritative sources outside of HQ for the purpose of activity reporting (e.g. On Boarding, Off Boarding, Service Operations);
- g. Manages service requests by utilizing on-line tools that enable users to initiate and track them through an online system, and integrates this system with the NSSC's Enterprise Service Desk and Enterprise Service Request System;
- h. Is accessible, at varying levels as appropriate, via web browsers to the Contracting Officer's Representative (COR), Contracting Officer (CO), ITCD management, HQ Operations Management, ITCD Performance Monitors, Mission Directorate and Mission Support Task Managers, and other HITSS stakeholders;
- i. Contains financial reporting, task order management, invoicing and similar business information from the contractor's business system;
- j. Provides ability to view documents and analysis and an option to download;
- k. Is searchable, sort and retrievable by relationships and/or by common attributes;
- l. Provides an index and explanations of variances for metrics falling outside the minimum standard; and provides visibility into all aspects of technology updates including schedules for quarterly refresh, bi-annual technical infusion, prototypes, pilots, and plans.

Within 15 days of contract award, the Contractor must deliver an assessment of the HQ Business Intelligence System, a recommendation document for enhancements and improvements, a proposed design document for the recommended enhancements and improvements, a schedule for delivery and implementation of the enhancements and improvements, a cost estimate, and a functional, deployable

solution (in the HQ ITCD R&D environment) for the recommended enhancements and improvements. The enhancement, establishment, provisioning, and/or management of the online environment shall be completed and delivered within 3 months of the award of this contract.

DRD	Description	Frequency
DRD 2-2-2-1-1	Documentation environment of metrics, data, information, work requests, analytics, and deliverables implementation plan and implementation schedule	Delivered 5 days after contract start date. Updated and available weekly
DRD 2-2-2-1-2	Product Backlog Updates	Established 15 days after contract start date. Updates to the product backlog to be made weekly thereafter as prescribed by IT industry Agile concepts and procedures and ITCD's Agile SOPs and framework
DRD 2-2-2-1-3	Product Backlog Report	Delivered every two weeks

2.2.2.2 – Financial Reporting, Estimation, and Resource Management

The Contractor shall provide financial, estimation, and resource management reporting at the following levels for this contract:

- Contract Level – pricing plan, actual costs, resource plans, actual hours, cost variance, hour variances, and forecasts for costs, hours, and resources.
- Program Level – pricing plans, actual costs, resource plans, actual hours, cost variance, hour variances, forecasts for costs, hours, and resources for each major PWS section outlined in this contract.
- Service Level – pricing plans, actual costs, resource plans, actual hours, cost variance, hour variances, forecasts for costs, hours, and resources for each service supported by the contract.
- Project Level – estimated hours, estimated costs, estimated resources, planned schedules, actual hours, actual costs, actual resources, actual schedule, cost variance, hour variance, and schedule variances for each project and sub-project.
- Task Order Level – estimated hours, estimated costs, estimated resources, planned schedules, actual hours, actual costs, actual resources, actual schedule, cost variance, hour variance, pricing plans, forecasts for costs, hours, and resources.
- Work Request Level – estimated hours, estimated costs, estimated resources, planned schedules, actual hours, actual costs, actual resources, actual schedule, cost variance, hour variance, schedule variance, and velocity (estimated and actual).
- Asset Level – estimated O&M hours, estimated O&M costs, estimated O&M resources, actual O&M hours, actual O&M costs, estimated O&M resources, O&M cost variance, O&M resource variance, O&M hour variance, forecasts for costs, hours, and resources.

- Sprint and Release Level ---- estimated velocity, estimated hours, estimated costs, estimated resources, actual velocity, actual hours, actual resources, actual costs, velocity variance, hour variance, resource variance, and cost variance.
- Resource Level – for each HITSS staff on the contract, the Contractor shall provide estimated hours, estimated costs, actual hours, actual costs, and forecasts for costs, hours, and resources at the following levels for each monthly.
 - Program level
 - Service level
 - Project level
 - Task Order level
 - Work Request Level
 - Asset Level
 - Sprint and Release Level

The Contractor shall perform earned value management at the program, service, project, task order, work request, asset, sprint and release levels of delivery. The Contractor shall provide financial reporting, estimation, and resource management information based on a WBS reporting structure comparable, compatible, and traceable to the HQ ITCD's WBS, financial, program, project, work request, portfolio management, sprint, and release, and asset reporting structures. Financial data and reports, estimates, resource information and related/supporting data and information shall be stored in a system developed and implemented by the contractor within the NASA hosting environment and/or shall be stored in an existing HQ ITCD system that shall be enhanced by the contractor.

Within 3 days of contract award, the Contractor shall demonstrate a functional, operational, system that can produce artifacts to support ITCD financial, estimation, and resource management requirements.

DRD	Description	Frequency
DRD 2-2-2-2-1	Program Level Financial, Estimation, and Resource Reporting	Delivered monthly
DRD 2-2-2-2-2	Contract Level WYE Reporting <ul style="list-style-type: none"> • Total Number of WYES – Actual (on-site and off-site) • Total Number of WYES – Planned (on-site and off-site) • Number of WYES by Technical Area (on-site and off-site) • Number of WYES by prime versus subcontractor 	Delivered monthly

DRD	Description	Frequency
	<ul style="list-style-type: none"> For the contract, Variance explanation for WYE planned versus actual Program Level Reporting <ul style="list-style-type: none"> Total Number of WYES grouped by PWS section For each PWS section, the Number of WYES Actual (on-site and off-site) For each PWS section, Total Number of WYES – Planned (on-site and off-site) For each PWS section, Number of WYES by Technical Area (on-site and off-site) For each PWS section, Number of WYES by prime versus subcontractor For each PWS section, Variance explanation for WYE planned versus actual. 	
DRD 2-2-2-2-3	Contract Level Reporting – includes 533s (and other financial and planning data), status reports (work planned, work accomplished, work in progress, risks, issues)	Delivered monthly
DRD 2-2-2-2-4	Program Level Reporting - includes 533s (and other financial and planning data), status reports (work planned, work accomplished, work in progress, risks, issues)	Delivered monthly
DRD 2-2-2-2-5	Service Level Report	Delivered monthly

DRD	Description	Frequency
DRD 2-2-2-2-6	Task Order Report - includes 533s (and other financial and planning data), status reports (work planned, work accomplished, work in progress, risks, issues)	Delivered monthly
DRD 2-2-2-2-7	Contract Level Financial, Estimation, and Resource Reporting	Delivered monthly
DRD 2-2-2-2-8	Project Level Report	Delivered monthly
DRD 2-2-2-2-9	Work Request Level Report	Delivered monthly
DRD 2-2-2-2-10	Asset Level Report	Delivered monthly
DRD 2-2-2-2-11	Sprint and Release Level Report	Delivered monthly
DRD 2-2-2-2-12	Reserved	
DRD 2-2-2-2-13	EVM Report	Delivered monthly
DRD 2-2-2-2-14	WBS Matrix	First delivery 5 days after contract award; second delivery 20 days after contract award; thereafter delivered and maintained monthly
DRD 2-2-2-2-15	WBS and Financial Review	Monthly

Metric #	Description	Metric
Metric 2-2-2-2-2-1	On-time submission of program management data deliverables	On-time delivery 99% of the time

Service Level Agreement #	Description	Service Level Agreement
SLA 2-2-1	Report the Accuracy of program management data and reporting	Program Management data and reporting will be 100% accurate
SLA 2-2-2	Reasonableness of estimates	Estimates provided for decision making purposes and planning purposes will be accompanied with a justification. Estimates must be provided within 48 hours of request or process/framework requirements

		unless otherwise negotiated with the government
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2.2.3 Analytics

The Contractor shall provide services and support of the analysis of metrics, resource management, asset management, financial management, portfolio management, service management, change and configuration management, and other IT management products to ensure effective execution and management of ITCD's ITIL framework, ITIL lifecycles, and processes.

The Contractor shall utilize ITCD systems (such as but not limited to (e.g. SOPR (Standard Operating Procedures Repository) , RAM (Rational Asset Manager), work management systems (e.g. WRIS (the Work Request In-Take System), WMS (the Work Management System), RTC (Rational Team Concert)), lifecycle management (e.g. Rational CLM and other supporting lifecycle management tools), CCB tools (e.g. the RTC Change Request Module), the project management and portfolio management system (e.g. the HQ Project and Portfolio Management System (HQPPMS)) and vendor systems to:

- a. Perform analysis of metrics, reports, market research, and other IT management data and information to assist and support ITCD in continuous service improvement, operations improvement, program improvement;
- b. Develop and implement a repository to store analysis results, track recommended corrective actions, track status, and other related information;
- c. Support the management and maintenance of the repository for analysis results;
- d. Provide statistical analysis, trending/trend analysis, and forecasting of metric outcomes to support ITCD's IT management activities such as but not limited to the following to compare as-is and to-be results based on identified corrective actions and proposed mitigations of issues and deficiencies:
 - i. Service management and service integration
 - ii. Portfolio management
 - iii. ITCD's ITIL framework
 - iv. Software development, systems engineering and implementation, and technology lifecycle execution and management
 - v. Asset management and inventory management
 - vi. Technology management

The Contractor shall provide support to HQ ITCD for viewing and understanding as-is state of services, the portfolio, ITIL framework, operations, financials/costs, lifecycle management, etc. and the consequences of these areas if deficiencies and issues identified based on analysis of metrics, data, information, reports, etc. are not addressed. The Contractor shall provide support to ITCD with identifying and understanding what the to-be state would look like if corrective actions and mitigations of the issues and deficiencies identified in the analysis are addressed and implemented.

DRD	Description	Frequency
DRD 2-2-3-1	Analytics Report (must address 2.2.3a – d and subsections)	Monthly
DRD 2-2-3-2	Analytics Database Design, Development Schedule, and Implementation Plan	Delivered 10 days after contract award
DRD 2-2-3-3	Analytics Database (for to storing analysis results, tracking recommended corrective actions, tracking status, and other related information)	Delivered 60 days after contract award
DRD 2-2-3-4	Analytics Database Data Management Plan, SOP and CONOPS	Delivered 30 days after contract award
DRD 2-2-3-5	Analytics Database Data Management Plan, SOP, and CONOPS Updates	Delivered quarterly
DRD 2-2-3-6	Product Backlog Updates	Established 15 days after contract start date. Updates to the product backlog to be made weekly thereafter as prescribed by IT industry Agile concepts and procedures and ITCD's Agile SOPs and framework
DRD 2-2-3-7	Product Backlog Report	Delivered every two weeks

2.2.4 Earned Value Management

The Contractor shall calculate earned value for this contract including all task orders under this contract. Upon request, NASA HQ ITCD and/or IDIQ customer request, the Contractor shall establish, maintain, and manage a WBS structure, the cost account, and work package constructs for the appropriate levels of data capture to ensure alignment with ITCD metrics/metrics management, analytics, financial, and other reporting requirements. Otherwise, the Contractor shall calculate earned value (related metrics) to level 2 of the WBS at the program level and to a WBS level requested by NASA HQ ITCD and/or IDIQs for project level reporting.

The Contract shall utilize an earned value management process (when a formal EVM requirement is requested) and shall utilize a tool (provided by NASA HQ ITCD) to calculate earned value. The Contractor shall ensure that its earned value management framework and processes support and integrate with the ITCD project management, portfolio management, financial management, ITIL

program management, and metrics frameworks and requirements. Additionally, the Contractor shall maintain and enhance the NASA HQ ITCD EVM tool.

DRD	Description	Frequency
DRD 2-2-4-1	Financial Reporting Structure (including charge code/charge numbering schema), WBS Structure, WBS Dictionary, Cost Account Structure, Work Package Structure	Baseline to be delivered 5 days after contract award; updates to be delivered monthly
DRD 2-2-4-2	EVM Report	Monthly
DRD 2-2-4-3	EVM Tool Maintenance Plan	Quarterly
DRD 2-2-4-4	Earned Value Management Plan, SOP and CONOPS	Delivered 10 days after contract award

2.3 Program Management

The Contractor shall perform program management of the HITSS contract to ensure management of resources, costs, services, products, and delivery. Program management shall be performed by the Contractor across all task orders (IDIQ) established on the HITSS contract for all services, support, deliverables, and products.

The Contractor shall utilize existing applications, tools, and technology in the development, generation, and delivery of deliverables. Identify automation and process improvements to facilitate the development, generation, and submission of deliverables. Likewise, NASA HQ ITCD will access existing applications, tools, systems, and repositories to access DRDs where and when DRDs are developed, generated, delivered, and stored in applications, tools, systems, and/or repositories. The intent of this approach is to streamline processes and delivery methods for DRDs. As several of the DRDs required for this contract are reports, the Contractor shall create and store reports (associated with DRDs) utilizing new and existing applications, tools, systems, etc. to reduce processing methods.

2.3.1 Integrated Master Schedule

The Contractor shall develop and maintain an ITCD Integrated Master Schedule (IMS) of all ongoing and planned activities. The primary purpose of the ITCD IMS, for use by the Contractor and Government, is to provide a day-to-day tool for executing the HQ IT Program, tracking individual project/work request/sprint/release technical, and schedule status sufficiently to depict any significant risks and priority trade-offs. It also serves to strengthen the effectiveness of Contractor/Government communications, providing an early warning system of issues and concerns regarding critical projects. The Contractor shall:

- a. When specified by the COR, include those projects/work requests/sprints/releases for which the Contractor is not primarily responsible;
- b. Create and maintain the IMS using a scheduling system that utilizes features such as resource loading and project/work request/sprint/release dependencies to facilitate accuracy in reprioritization scenarios;
- c. Enable alternate categorization views that group projects/work requests/sprints/releases by strategic portfolio, by department, by resources, by ITCD's IT portfolio structure, by ITCD's service structure, by ITCD's financial reporting structure, and other structures, operational and IT management frameworks, functions, processes, and lifecycles;
- d. Provide secure web access to the IMS for NASA and Contractor project management leads;
- e. Use IMS briefings to ITCD staff, including progress assessments, identification of problems, and a discussion of critical path activities and urgent priorities; and
- f. Provide schedule adherence data that summarizes schedule performance for all milestones to include reporting of project re-baselines with explanations;
- g. Incorporate and integrate earned value management;

DRD	Description	Frequency
DRD 2-3-1-1	Integrated Master Schedule with ability to drill down to supporting data, including resource loading	Updated every 2 weeks from month two of contract start date
DRD 2-3-1-2	Project/Work Request/Sprint/Release Schedule Adherence Report	Monthly – no later than second week of the month
DRD 2-3-1-3	Schedule System	Deliver and implement a scheduling system

Metric #	Description	Metric
Metric 2-3-1-1	Adherence to Project Schedules. For all Service Requests completed during the evaluation period, all end dates shall be met in accordance with the baseline schedule	96% meet the criteria

2.3.2 Project Management

Effective coordination and implementation of tasks is critical to the management of multiple activities of different sizes and types. The Contractor shall implement project management tools and techniques for measuring progress and to achieve successful completion of project goals and objectives.

The Contractor's activities shall be consistent with NASA Procedural Requirements (NPR) 7120.7, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements, ITCD's Project Management Framework, ITCD's Portfolio Management Framework, ITCD's Agile Framework, and ITCD's Metrics Framework requirements, processes, and procedures.

ITCD requires project management, tracking, and project integration support for both internal and external projects. Internal projects are projects that are directly assigned to the Contractor by ITCD. An internal project could be a project sponsored by any HQ office, the Agency, a NASA Center in support of the Agency program offices located at HQ and have a significant IT content. In providing this support, the Contractor shall use the governing documents specified by the requiring HQ office.

External projects are projects where the implementation lead is not the HITSS Contractor but where the Contractor shall be responsible for coordination, participation, or analysis. The Contractor shall provide comments and recommendations to HQ on project plans prepared by other Contractors and other NASA Centers, the Office of the CIO, or other Government agencies. The Contractor shall provide project integration support for external projects to support ITCD's project integration activities.

DRD	Description	Frequency
DRD 2-3-2-1	Project Management Status Report	Weekly
DRD 2-3-2-2	Project Data	Daily

Metric #	Description	Metric
Metric 2-3-2-1	Adherence to the HQ ITCD Project Management Framework and processes	99% meets criteria

2.3.3 Portfolio Management

An essential component of IT Management is Portfolio Management. HQ ITCD implemented a Portfolio Management framework and model to ensure effective management of projects, assets, and technology as well as sound stewardship of IT investments. The criticality of providing financial information to the HQ and Agency management and executive committees and providing justification and data for investment decisions and prioritization of initiatives and projects is an increasing requirement for HQ ITCD in order to support its budget requirements.

The Contractor shall support HQ ITCD in its management, execution, enhancement, and maintenance of HQ ITCD's Portfolio Management framework, model, methodology, processes/procedures, data, metrics, governance, and reporting. The Contractor shall provide data required for:

- Selection and prioritization of investments, projects, and initiatives
- Analytics of projects, investments, assets, and initiatives
- Costs (planned, forecasted, actual, etc.) of projects, investments, assets, and initiatives
- Schedules (planned, forecasted, actual, etc.) of projects, investments, assets, and initiatives
- Resources (planned, forecasted, actual, etc.) for projects, investments, assets, and initiatives
- Reporting related to Portfolio Management and related practices such as governance, project management, risk management, ROI, cost benefits analysis, enterprise architecture, financial planning, management, and ITIL
- For metrics

The Contractor shall provide support of the management, enhancement, and maintenance of the HQ ITCD Portfolio and Project Management system. The Contractor shall support HQ ITCD in its cyclical auditing of portfolio management and project management data to ensure continuous improvement of portfolio management, project management, risk, metric, and financial data.

DRD	Description	Frequency
DRD 2-3-3-1	Portfolio Management Approach Document – this plan will address the Contractor's approach to Portfolio Management	To be delivered 10 days after contract award
DRD 2-3-3-2	Portfolio Management Team Experience Profile – this document will be provided to the government to describe the skills, experience, and structure of contractor staff supporting Portfolio Management	To be delivered 10 days after contract award
DRD 2-3-3-3	Portfolio Management Report	Monthly
DRD 2-3-3-4	Portfolio Management Metrics	Monthly
DRD 2-3-3-5	HQ ITCD Portfolio and Project Management System Maintenance Plan	Quarterly
DRD 2-3-3-6	Portfolio Management and Project Management Status Report	Monthly
DRD 2-3-3-7	Portfolio Management and Project Management Audit	Monthly, Quarterly, and Annually

DRD	Description	Frequency
DRD 2-3-3-8	Portfolio Management and Project Management Audit Report	Monthly, Quarterly, and Annually

2.3.4 Knowledge Management

Knowledge Management is essential to identification, maintenance, and management of data, information, knowledge utilized in support of services provided by ITCD, in preparation and support for COOP and Emergency Preparedness planning, preparation, risk management, lessons learned, transition planning (including off-boarding and on-boarding), information security, continuous improvement, emerging technology needs, technical requirements, data requirements, and business requirements. The Contractor shall establish Knowledge Management to support ITCD, and HQ, and adhere to the Agency's Knowledge Management processes, requirements, and business needs. ITCD requires that the contractor shall provide data, information, and knowledge (includes processes, roles, responsibilities, tools, systems, etc.) produced, consumed, utilized, distributed (internally and externally), and processed in daily operations of the HITSS program.

DRD	Description	Frequency
DRD 2-3-4-1	Knowledge Management Status Report	Monthly
DRD 2-3-4-2	Staff Transition Plan for each role on HITSS	30 days after contract start date; updates quarterly
DRD 2-3-4-3	Staff Transition Plan Updates	Quarterly

2.3.5 Quality Assurance

The Contractor shall ensure the quality of Contractor provided products and services. The Contractor shall be responsible for assuring conformance of products to requirements, methods, and standards established by NASA, including verification and validation of products and services delivered under this contract. This shall include software assurance for all applications development activities. The Contractor shall provide, implement, and maintain a quality assurance process that includes plans and procedures to ensure that products and services delivered conform to contract requirements, reflect industry best practices, and are consistent with a lifecycle approach.

DRD	Description	Frequency
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DRD 2-3-5-1	Product Defect Statistics and Report	Ongoing
DRD 2-3-5-2	QA Status Report	Ongoing
DRD 2-3-5-3	QA Corrective Actions and Recommendations	Ongoing
DRD 2-3-5-4	Corrective Action and Recommendation Implementation	Ongoing

Metric #	Description	Metric
Metric 2-3-5-1	Product Defect Prevention and Effective Corrective Actions	No product defects 99% in all products delivered and developed 99% of corrective actions implemented with 100% government acceptance criteria met

2.3.6 Risk Management

The Contractor shall identify and characterize IT-related risks, devising mitigation steps, and monitoring risks and mitigation activities on an ongoing basis. The Contractor shall provide support in drafting, for NASA consideration, risk management plans associated with IT investments. The Contractor shall support HQ ITCD's division level risk management plan and the risk management plan for the HQ ITCD IT Portfolio.

The requiring NASA organization and/or office will specify the format and overall requirements for the risk management activities, including the risk management plan. Those requirements shall be consistent with NASA policy concerning risk management. Currently, the following policy documents are relevant to this activity: NPR 8000.4 (Risk Management Procedural Requirements), Procurement Information Circular (PIC) 99-09 (Risk Management), NPR 7120.5 (NASA Program and Project Management Requirements and Processes), and NPR 2810.1 (Security of Information Technology). The Contractor shall demonstrate awareness of industry risk management practices, processes and standards and shall assist HQ ITCD with incorporating industry risk management practices, processes, and standards into risk frameworks at the division (such as HQ ITCD), IT Portfolio, and IT investment, project, asset, program, and service levels.

The Contractor shall provide support for the execution, management, enhancement, analysis, and improvement of Risk Management for IT for HQ ITCD, offices, and organizations and consumers of HQ ITCD services.

DRD	Description	Frequency
DRD 2-3-6-1	Risk Management Approach Document – this plan will address the Contractor’s approach to Risk Management	To be delivered 10 days after contract award
DRD 2-3-6-2	Risk Management Team Experience Profile – this document will be provided to the government to describe the skills, experience, and structure of contractor staff supporting Risk Management	To be delivered 10 days after contract award
DRD 2-3-6-3	Risk Management Report	Monthly
DRD 2-3-6-4	Risk Management Metrics	Monthly
DRD 2-3-6-5	HQ ITCD Risk Management System Maintenance Plan	Quarterly
DRD 2-3-6-6	Risk Management Status Report	Monthly
DRD 2-3-6-7	Risk Management Audit	Monthly, Quarterly, and Annually
DRD 2-3-6-8	Risk Management Audit Report	Monthly, Quarterly, and Annually

Metric #	Description	Metric
Metric 2-3-6-1	Risk Management Mitigation	100% of risks identified are mitigated by the contractor or accepted by ITCD
Metric 2-3-6-2	Risk Management Mitigation	100% of contingency plans approved by the government are implemented and executed successfully

2.3.7 Compliance

The Contractor shall provide support of the execution, management, maintenance, review, assessment, and improvement of IT standards; HQ ITCD regulations, requirements, and policies; Agency policies and standards; federal regulations and requirements.

The Contractor shall have IT standards for IT disciplines such as software engineering, software development, systems development, system architecture, systems engineering, service operation management, web services, integration services, testing, requirements development and management, estimation, software development lifecycle processes and procedures (such as scrum agile, waterfall, etc.), change management and configuration management. The Contractor shall establish an IT Standards Catalog containing all standards for IT, enterprise architecture, programmatic, project

management, portfolio management, risk management, and any other related and supporting practices that will be employed, enforced, and employed on this contract upon government vetting and concurrence. The Contractor shall ensure that all standards and policies are current, relevant, applicable, and maintained for quality of services, products, deliverables, and support provided through this contract.

The Contractor shall provide support and data for the management, maintenance, and enhancement of the HQ ITCD standards reference model.

Metric #	Description	Metric
Metric 2-3-7-1	Standards Compliance	99% compliance across all standards, regulations, directives, processes, frameworks, and services implemented and executed on the contract
Metric 2-3-7-2	Management and Maintenance of Standards	100% of all standards processes, frameworks, and related artifacts are maintained according to NASA, ITCD, HQ, federal, and/or IT best practice/industry changes, requirements, and improvements

2.3.8 Technology Management

The effectiveness and benefit realized from IT services and related capabilities is largely dependent on the synergy of IT staff with emerging technologies, as well as continuous assessment and management of technologies currently in use in the IT infrastructure, systems, and services. The Contractor shall have an established methodology for identifying, assessing, and managing technology for use and in use in the IT infrastructure, systems, and by services. The Contractor shall assist and support NASA HQ ITCD with

- the ITCD Emerging Technology Program
- management, assessment, enhancement, and maintenance of the Technical Reference Model
- management, assessment, enhancement, and maintenance of its Enterprise Architecture model, methodology, and framework to include technical architecture, data architecture, business architecture, system architectures
- management, assessment, enhancement, and maintenance of the service catalog, technical service requirements and related architectures, technical portfolios such as application portfolio, and IT assets supporting IT infrastructure, systems, and services
- management, assessment, enhancement, and/or maintenance of the vendor support and maintenance agreements, software licenses, software versions

DRD	Description	Frequency
DRD 2-3-8-1	Application Portfolio Report	Monthly

DRD	Description	Frequency
DRD 2-3-8-2	Application Portfolio Backlog	Monthly
DRD 2-3-8-3	Application Portfolio Maintenance, Assessment, and Management	Daily
DRD 2-3-8-4	IT Service Catalog Backlog	Monthly
DRD 2-3-8-5	Vendor Support and Software License Management System Maintenance, Assessment, and Management	Daily
DRD 2-3-8-6	IT Service Catalog Maintenance, Assessment, and Management	Monthly
DRD 2-3-8-7	IT Service Catalog Report	Monthly
DRD 2-3-8-8	Vendor Support Agreement and Software License Management Report	Monthly
DRD 2-3-8-9	Enterprise Architecture Plan, Methodology, and Maintenance Plan Updates	Quarterly
DRD 2-3-8-10	Data Architecture Model Updates	Monthly
DRD 2-3-8-11	Business Architecture Model Updates	Monthly
DRD 2-3-8-12	Technical Reference Model Updates	Monthly
DRD 2-3-8-13	Technical Architecture Model Updates	Monthly
DRD 2-3-8-14	Technical Service Requirements Recommendation Report	Monthly
DRD 2-3-8-15	Software Version Assessment Report and Recommendation Report	Monthly
DRD 2-3-8-16	Emerging Technology Program Status Report	Monthly
DRD 2-3-8-17	Emerging Technology Program Roadmap	Monthly
DRD 2-3-8-18	Emerging Technology Program Proposed Technology Recommendation	Monthly

Metric #	Description	Metric
Metric 2-3-8-1	All Technology Management Products and Deliverables	The contractor shall provide all Technology Management products and deliverables with 100% accuracy, relevance, and validity per federal, NASA, HQ, ITCD, and/or industry (accredited) standards
Metric 2-3-8-2	Application Portfolio Management and Maintenance	The contractor shall manage and maintain the application portfolio to 100% accuracy
Metric 2-3-8-3	Data, Technical, Business and Enterprise Architecture Model Updates, Management, and Maintenance	The contractor shall manage and maintain the data, technical, business, and enterprise architecture model updates with 100% accuracy

2.3.9 ITIL and Service Management

A critical component of IT Management is service management. ITIL provides an approach for managing IT services which consists of IT Service Management (ITSM) that addressing the lifecycle of an IT service from ideation/strategic planning through design, implementation/transition, operations and maintenance, continuous improvement, and retirement. The Contractor shall perform ITSM using the ITIL framework and shall demonstrate competency, experience, management, and execution in each of the five stages of the IT Service lifecycle: Service Strategy, Service Design, Service Transition, Service Operation, and Continual Service Improvement as well as the processes and functions required for each.

NASA HQ ITCD must be able to manage the portfolio of services, the demand, the availability, and the capacity of services it provides to HQ, end users, other NASA Centers, and to the Agency. The Contractor shall be required to demonstrate competency in service management and planning, as well as experience and expertise in managing a portfolio of IT services.

2.3.9.1 Service Portfolio

The Contractor shall assist NASA HQ ITCD with the maintenance and management of the ITCD and HQ Service Portfolio. The Contractor shall capture performance indicators such as (but not limited to) the following:

- Number of business-critical IT-enabled service customer needs unmet
- Number of services categorized by business architecture
- Percentage customer satisfaction with current IT service offerings
- Number of services meeting current business needs
- Number of services no longer meeting business needs

DRD	Description	Frequency
DRD 2-3-9-1-1	Service Portfolio Report	Monthly
DRD 2-3-9-1-2	Service Portfolio Risk Management Plan	Due 30 days after contract award; due quarterly thereafter
DRD 2-3-9-1-3	Service Portfolio Risk Mitigation Plan	With each identified risk

Metric #	Description	Metric
Metric 2-3-9-1-1	Service Portfolio Management	The contractor shall manage and maintain the service portfolio to 100% accuracy

2.3.9.2 Capacity Planning

The Contractor shall establish a framework for the determination of service capacity and for capacity planning. The Contractor shall support the calculation, assessment, and management of capacity for all IT services. The Contractor shall report results and provide recommendations for addressing capacity risk and related requirements.

DRD	Description	Frequency
DRD 2-3-9-2-1	Service Capacity Plan	Due 30 days upon contract award; updates due monthly
DRD 2-3-9-2-2	Service Capacity Assessment and Findings Report	Monthly
DRD 2-3-9-2-3	Service Capacity Risk Management Plan	Due 30 days upon contract award; updates due monthly
DRD 2-3-9-2-4	Service Capacity Mitigation Recommendation Report	Monthly

Metric #	Description	Metric
Metric 2-3-9-2-1	Service Capacity Management	The contractor shall report service capacity risks to the government within 4 hours of identifying the service capacity risk.
Metric 2-3-9-2-2	Service Capacity Risk Management Plan	The contractor shall mitigate risks to service capacity within 24 hours

2.3.9.3 Demand Management

ITIL ITSM requires assessment through checks and balances throughout the service lifecycle and to ensure that an organization can respond efficiently and effectively to changes in demand for services based on changes in customer business needs.

The Contractor shall establish a framework for the determination of service demand and for the management of service demand. The Contractor shall support the calculation, assessment, and management of demand for all IT services. The Contractor shall report results and provide recommendations for addressing capacity risk and related requirements.

DRD	Description	Frequency
DRD 2-3-9-3-1	Service Demand Management Plan	Due 30 days upon contract award; updates due monthly
DRD 2-3-9-3-2	Service Demand Assessment and Findings Report	Monthly
DRD 2-3-9-3-3	Service Demand Risk Management Plan	Due 30 days upon contract award; updates due monthly
DRD 2-3-9-3-4	Service Demand Mitigation Recommendation Report	Monthly

2.3.10 Support for Onsite Contractors

The Government shall provide office, desk, and associated infrastructure to house up to 28 contractor employees for onsite support of the core requirements at NASA Headquarters. This includes, but is not limited to required onsite support in the following functional areas: Data Center Operations, Systems Engineering and Integration Test Facility, Computer Training Center, and Communications Security Support and Services (COMSEC). Additional office space may be made available for support of task orders under the IDIQ portion of the contract.

Upon transition of the Communications Support Services Center (CSSC) services, the government will provide additional office space for contractor staff supporting the CSSC.

2.3.11 Contractor Staff Management

Management of contractor staff will support smooth operations of services and support provided through this contract. The Contractor shall establish, manage, and maintain plans, processes, and frameworks for ensuring current technical skills, competencies, and experience are readily available; for timely backfill of vacant contractor positions; for providing government review and feedback of proposed roles and candidates for vacant and required contractor positions for services and support; for effective customer relationship management; for risk management; for security; and for communications.

2.3.11.1 Backfill and Hire Requirements for Vacant Contractor Positions

- The Contractor shall provide job descriptions for each role on the contract.
- The Contractor shall respond to the government's technical requirements for contractor roles and positions on the contract and shall include these requirements in the selection of contractor staff.
- The Contractor shall continuously refine technical requirements and skills required for hiring contractor staff through collaboration with the NASA HQ ITCD.
- The Contractor shall address vacancies/backfills with contractor staff that meets and/or exceeds the government's requirements for services and support required for that position.
- The Contractor shall review labor categories and staff skills and experience. The Contractor shall provide the government with a report of the analysis results quarterly.

DRD	Description	Frequency
DRD 2-3-11-1-1	Contractor Staff Removal Response Plan	Upon request from government for contractor staff removal from the contract
DRD 2-3-11-1-2	Contractor Backfill Plan	Due 15 days upon contract award; updates due quarterly
DRD 2-3-11-1-3	Contractor Hiring Process and Plan	Due 15 days upon contract award; updates due quarterly
DRD 2-3-11-1-4	Quarterly Contractor Staff Technical Skill Review Meeting	Quarterly
DRD 2-3-11-1-5	Quarterly Review and Reporting of Labor Categories and Staff Skills/Experience (report includes proposed mitigation)	Quarterly

Metric #	Description	Metric
Metric 2-3-11-1-1	Contractor Staff Off-boarding for non-emergency and non-security matters	Contractor staff must be off-boarded within 5 days of government's request
Metric 2-3-11-1-2	Contractor Staff Off-boarding for emergency terminations	Contractor staff must be terminated within 1 hour
Metric 2-3-11-1-3	Contractor Backfills	Within 5 days of vacancy

Metric 2-3-11-1-4	Contractor New Hires for New Positions/Roles	Within 15 days of government approval of the new position/role
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2.3.11.2 Technical Skill Management and Technical Competency Management

Technical skills, experience, and competency is essential to the successful delivery, maintenance, management, and enhancement of technology, technical solutions, and related services and support. The Contractor shall establish a Technical Skill and Competency Maintenance Framework and Plan for

- Equipping contractor staff with requested technology and related skills and competencies
- Identifying current technology, technology changing, and technology standards
- Addressing deficiencies in skills and competencies in contractor staff
- Managing technical risks to the contract due to insufficient technical skills and technical staff
- Addressing issues reported by the government with regards to technical skill deficiencies and technology deficiencies
- Executing requests made by the government with regards to discontinuance of support from specific contractor staff members

The Contractor shall be responsible for all technical training of Contractor staff, unless otherwise directed by the Government. The Contractor shall provide technical staffing proficient in the tools and technologies utilized, supported, planned, and targeted under this contract. The contractor shall develop a set of experience and skills required for each role, position, and function on the contract (and IDIQ task orders established on the contract). The set of experience and skills required for each role, position, and function on the contract shall be reviewed and approved/accepted by the government prior to the experience and skill definition to be considered as official for the services, roles, functions, and support provided and performed on the contract.

DRD	Description	Frequency
DRD 2-3-11-2-1	Contractor Staff Training Plan	Monthly
DRD 2-3-11-2-2	Contractor Staff Training Methodology and Processes	Due 15 days after contract award; quarterly thereafter
DRD 2-3-11-2-3	Contractor Staff Skills Assessment and Skills Gap Report and Mitigation Plan	Monthly
DRD 2-3-11-2-4	Contractor Staff Training Status Report	Monthly
DRD 2-3-11-2-5	Contractor Staff Technical skill and Competency Maintenance Assessment Framework/Methodology and Assessment Criteria	Due 15 days after contract award; quarterly thereafter

DRD	Description	Frequency
DRD 2-3-11-2-6	Contractor Staff Exit Plan and Transition Plan	Due with every staff termination
DRD 2-3-11-2-7	Catalog of skills and experience for each function, role, and support provided on the contract	Due within 15 days of contract award; Due monthly thereafter
DRD 2-3-11-2-8	Technical Experience Corrective Action Plan	Due within 15 days of contract award; monthly thereafter

Metric #	Description	Metric
Metric 2-3-11-2-1	Technical Experience Corrective Action	The contractor shall ensure that 100% of staff have skills and experience requested and required by the government

Service Level Agreement #	Description	SLA
SLA 2-3-11-2-1	Transition Planning	<p>The contractor shall provide a transition plan for each staff within:</p> <ul style="list-style-type: none"> • 2 hours (for emergency terminations by the vendor/contractor) • 48 hours (for resignation by the contractor employee) • 24 hours (for terminations by the vendor/contractor) • 2 hours (for emergency off-boarding of contractor staff requested by the government) • 24 hours (for off-boarding of contractor staff requested by the government)

2.3.12 Customer Relationship Management and Communications

One of NASA HQ ITCD's goals as a division is to be a trusted partner with HQ, Agency, and NASA Centers for IT capabilities and solutions. As such, these goals are essential in demonstrating both technical and business value, it is required that the Contractor assist NASA HQ ITCD with establishing, refining, and managing an intake process for identifying, capturing, documenting, working, and providing status on request requests for IT services and that the Contractor establish a communication plan to ensure feedback, escalation, collaboration, and partnership with NASA HQ ITCD for delivery and issue resolution.

The Contractor shall support NASA HQ ITCD with maintaining, improving, managing, and executing its Customer Relationship Management framework, model, and related processes. The contractor shall support identification of key stakeholders and change agents, customer communication, customer business process knowledge, customer problem tracking and mitigation, customer training, and identifying and facilitating customer solutions. The Contractor shall assist in defining, refining, and analyzing metrics and in recommending corrective actions for resolution of customer issues and risks. In collaboration, ITCD and the contractor shall identify solutions and mitigation strategies to deliver effective IT solutions geared to customer's requirements.

Customer Service Model

The contractor shall provide a consolidated approach to delivering a comprehensive range of end user support services for HQ employees. Essential for building a strong relationship with customers is an effective Customer Service Model that focuses on understanding customer requirements and values and consistently monitors customer feedback for signs of problems or difficulties. The contractor shall implement a customer service model that:

- a. Is perceived by each individual customer as competent, responsive, and timely;
- b. Supports all ITCD programs, projects, and services. Contract staff shall identify themselves as contractors representing all ITCD programs, regardless of where the end service is provided;
- c. Anticipates issues, concerns, and problems and preemptively initiates resolution;
- d. Effectively develops and disseminates information regarding available services and technologies, system outages, new initiatives, etc.;
- e. Effectively coordinates with ITCD Customer Engagement Managers, HQ Organizational IT Points of Contacts, Task Managers, the Enterprise Service Desk, the Agency strategic sourcing contractors and other contractor Customer Service representatives to provide a uniform approach to customer service;
- f. Understands the evolving IT requirements of the customer;
- g. Coordinates with ITCD to ensure recommendations and approaches can be supported;
- h. Coordinates with IT Security to ensure any recommended solution or changes are secure;
- i. Provides a method, subject to NASA approval, to obtain after-hours emergency support (defined as support for senior NASA officials, time-sensitive critical action, or a service interruption that involves a significant percentage of the HQ population);
- j. Proposes, for Government approval, metrics that describe service delivery activities to measure contract performance with regard to service delivery, customer feedback, quality assurance and timely delivery of products and services;
- k. Provides contractor developed surveys and the means to administer them. Provides continuously available customer feedback and other information to the Government of sufficient detail to identify trends and gaps of customer requests for service and services rendered; and incorporates ITIL3 principles and practices to align with NASA service delivery and provide continuous service improvement.

2.3.13 Customer Education and Outreach

The Contractor shall provide customer training, end-user documentation, and communication activities for IT applications, services, and issues that affect the HQ user community (NASA employees, contractors, and NASA HQ consultants). The contractor shall provide training using classes, video files, and online content and printed materials. Classroom training shall be conducted in the on-site training facility (Title, To Be Determined), Monday through Friday, except Federal holidays, between 8:00 a.m. until 4:30 p.m. local time.

The contractor shall assist NASA in planning for and implementing change associated with new IT capabilities within HQ and the Agency. NASA may call upon the contractor to provide support not only for HQ-specific system implementations, but also for Agency-wide initiatives that may impact HQ's infrastructure, processes, or policies. Those activities include impact assessment of proposed change(s), modification, and coordination of required changes, and documentation of change management processes and procedures.

ITCD's IT communication program provides strategic, tactical, and proactive communication support for HQ CIO and all supported IT programs. The contractor shall provide customer communication support, including development, maintenance, and execution of the ITCD Communications Plan. Program support includes identification of stakeholder/audience; message delivery methodologies; message timing; message content; technology to business terminology translation. Additionally, the contractor shall provide timely submission for recurring outreach messages, including NASA HQ: Facebook page; twice-weekly Heads' Up; NASA, Inc newsletter; and others as defined. Specific outreach will also be required to communicate, "IT Notices" and associated distribution list.

The contractor shall provide training for IT applications and services. The contractor shall develop and document a Training Program approach and framework and provide to the government within 60 days of contract start. Training methods shall include one-on-one, group, instructor led, remote, tutorial self-paced, virtually over the web, and on recorded media. Training is required for both legacy applications and newly development applications. In addition, HQ users are increasingly impacted by NASA applications and services housed outside of HQ, and HQ is at times called upon to develop and/or deliver end-user documentation, outreach and computer training if no existing materials are available prior to deployment at HQ. Training materials shall be provided for both instructors and students to facilitate use of applications and solutions provided or supported under this contract. The contractor shall recommend the appropriate training scope for each project for government approval and should include approach, timing, dependencies, and audience. The contractor shall schedule and facilitate training sessions including facilities and equipment.

Customer advocacy and coordination groups will be supported and facilitated by the contractor. This includes recurring meetings for the Customer Service Project Reviews and Customer Advisory Committee. Coordination and communication with customer advocacy groups is a critical success component for ITCD projects.

DRD #	Description	Frequency
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DRD 2-3-13-1	Training Program & Outreach Plan, detailing materials, methods and approach	60 days from contract start
DRD 2-3-13-2	Customer Advisory and Service Review, meeting notes, action items, results, and schedule	As required within 2 business days of meetings

Metric #	Description	Metric
Metric 2-3-13-1	Delivery of Training Program & Outreach Plan to include communications, and facilitating relationship-building activity. Initial plan and updates shall be submitted on time.	Submitted 30 calendar days prior to new performance/incentive fee reporting period
Metric 2-3-13-2	Compliance with Training Program & Outreach Plan Objectives as agreed to by the Contractor and the Government shall be accomplished during each period	91% of objectives are achieved

2.3.14 Customer Relationship Management and Communications

One of NASA HQ ITCD's goals as a division is to be a trusted partner with HQ, Agency, and NASA Centers for IT capabilities and solutions. These goals are essential in demonstrating both technical and business value, it is required that the Contractor assist NASA HQ ITCD with establishing, refining, and managing an intake process for identifying, capturing, documenting, working, and statusing requests for IT services and that the Contractor establish a communication plan to ensure feedback, escalation, collaboration, and partnership with NASA HQ ITCD for delivery and issue resolution.

The Contractor shall support NASA HQ ITCD with maintaining, improving, managing, and executing its Customer Relationship Management framework, model, and related processes. The Contractor shall assist in defining, refining, and analyzing metrics and in recommending corrective actions for resolution of customer issues and risks.

2.3.15 On-Boarding and Off-Boarding of HITSS Contractor Staff

The Contractor shall be audited for compliance to policies (including but not limited to) to Records Management, Security/Badging (as well as the DD254), Asset Management, Access Management, and Credential Management for off-boarding and on-boarding HITSS staff.

Prior to requesting that contractor staff be onboarded, the Contractor shall conduct background checks, security checks, clearance checks, and other suitability checks and evaluation of all contractor staff. The Contractor shall ensure that security, records and data management, knowledge management, and technical risks are minimized and/or mitigated through stringent evaluation of all contractor staff. The government reserves the right to deny requests for onboarding and to deny requests for access to NASA systems based on perceived, probable, and/or potential cause and risk based on information received through official government channels. Furthermore, HQ ITCD reserves the right to initiate the offboarding of contractor staff if such risk is identified and/or communicated regardless of the decision of the NASA security office.

DRD	Description	Frequency
DRD 2-3-15-1	HITSS On-Boarding Report	Weekly
DRD 2-3-15-2	HITSS Off-Boarding Report	Weekly
DRD 2-3-15-3	HITSS On-Boarding Checklist	Submitted to the government for each HITSS employee on-boarding 2 weeks before execution of on-boarding activity
DRD 2-3-15-4	HITSS Off-Boarding Checklist	Submitted to the government for each employee off-boarding 2 weeks before execution of off-boarding activity
DRD 2-3-15-5	HITSS On-Boarding and Off-Boarding SOP	Due 10 days after contract award; updates due quarterly. More frequent updates may be requested by the government
DRD 2-3-15-6	HITSS On-Boarding and Off-Boarding Compliance Metrics Report	Entries required with each on-boarding and off-boarding activity

Metric #	Description	Metric
Metric 2-3-15-1	Accuracy of Active and Inactive Contractor Status Data	100% accuracy of IdMax active and inactive contractor staff report data

Service Level Agreement #	Description	SLA
SLA 2-3-15-1	Off Boarding/Termination Requests in IdMax	<p>The contractor shall submit off boarding/termination of contractor staff identities within 24 hours of receiving notice of contractor staff resignation or communicating intent to release contractor staff from the contract</p> <p>The contractor shall submit off boarding/termination of contractor staff identities immediately upon emergency termination or contract release</p>

2.3.16 Logistics, Asset Management, and Property Management

The Contractor shall maintain accurate asset records for all Government property for which the Contractor is responsible. This includes but is not limited to hardware, hardware maintenance, software, and software licenses. The records in the NASA property management application (e.g., N-PROP) shall be kept up to date. The Contractor shall conduct periodic inventories and adhere to the pertinent provisions and procedures of the most current NASA property management regulations. The contractor shall describe how they will meet the requirement and process for managing the onsite government property, government furnished equipment, and contractor acquired property. The Contractor shall, based on original quantity of inventory items, maintain lost property rate at 0.25% or less per year.

The contractor shall report inventory of assets and equipment such as, but not limited to, laptops, mobile devices, printers, external drives, etc. assigned to each contractor employee. The inventory recorded shall be reported to support asset management, asset management, asset tracking, and invoice validation.

The inventory of assets is recorded in agency systems Equipment System, and ServiceNow. Any updates to asset location or assignments will be updated and maintained in these systems and consumed by the HQ Asset Management System. HQ ITCD maintains processes for monthly reconciliation of discrepancies between the HAMS system and the Agency systems, to ensure updates are noted and applied to the appropriate source or destination system. The contractor shall maintain and improve Standard Operating Procedures for identifying new, changed and retired assets, asset disposal and implementing corrections to Agency and HQ asset management systems where needed.

DRD	Description	Frequency
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DRD 2-3-16-1	Logistics Management Plan	Three months after contract start date
DRD 2-3-16-2	Logistics Management Status Report	Monthly
DRD 2-3-16-3	Asset Inventory, Updates, Variances/Changes	Monthly
DRD 2-3-16-4	Asset Management Plan for HITSS	15 days after contract start date; updates quarterly
DRD 2-3-16-5	Asset Management Process for HITSS	15 days after contract start date; updates quarterly
DRD 2-3-16-6	Report results from Annual Audit of HQ GFE IT equipment	6 months after contract start, annually thereafter
DRD 2-3-16-7	Report of new and excessed GFE IT equipment	One month after contract start, monthly thereafter

2.3.17 Management of and Support for Other Direct Costs

The contractor shall assist in the management of other direct costs (ODCs) and will support the procurement/purchasing of ODCs (such as but not limited to vendor support services/maintenance agreements, license purchases, equipment, assets, etc.) on and for this contract (the core and IDIQ task orders). When appropriate, the contractor shall ensure that items, agreements/service agreements, licenses, etc. are procured according to processes and procurement vehicles such as SEWP, EMLT, etc. If the product is available through an Agency strategic sourcing initiative and not obtained through the the approved Agency defined source a wiaver deviating from the NASA FAR Supplement is required.

2.3.18 Hours of Operation

Core hours for NASA HQ are 9:00 am to 3:00pm. However, to ensure consistency in availability of services and support, baseline hours for the contract are 7:00 am to 6:00 pm. The contractor shall ensure appropriate staffing to accommodate the main hours for which the majority of the HQ consumer and customer base are utilizing services.

Although, core hours for NASA HQ and baseline hours for the contract are established, some services will require hours beyond NASA HQ core hours and the HITSS baseline hours. The contractor shall provide support and services for these additional support hours as described and required in other sections of this performance work statement and/or as requested by NASA HQ and IDIQ customers. Additionally, the contractor shall provide staffing, support, and services to meet service level agreements, metrics, and operational level agreements as needed and/or required for compliance with contract requirements.

2.3.19 Suitability and Security Clearance Requirements

All contractor personnel performing work under this contract shall be a United States citizen or a U.S. permanent resident. The contractor shall have the capability to provide personnel that have a Secret, Top Secret or Top Secret – SCI clearance, as required by NASA or as specified in this section of the PWS. All security clearance investigations must have been performed within the past 4 years and all clearances held by contractor personnel shall meet NASA’s requirements.

The contractor shall provide personnel holding security clearances to perform work on specific sections of the PWS as described in Contractor Security Clearance Requirements table below. The contractor shall work with NASA to determine the specific number of cleared individuals and levels of clearance required for each task.

Contractor Security Clearance Requirements		
PWS section	Specific functions	Minimum Security Clearance
2.3.6 Program Risk Management	Applies to all functions	Secret
9.0 Risk Management (and subsections)	Applies to all functions	Secret
15.0 Onboarding and Offboarding (and subsections)	Applies to all functions	Secret
16.0 IT Security Management and Information Security Management (and subsections)	Applies to all functions	Secret
22.0 Configuration Management (and subsections)	Applies to all functions	Secret
24.0 Testing and Test Management Services and Support (and subsections)	Applies to all functions	Secret
27.0 Systems Engineering & Implementation Services and Support (and subsections)	Applies to all functions	Secret
35.0 Infrastructure Services (and subsections)	Applies to all functions	Secret

Contractor Security Clearance Requirements		
PWS section	Specific functions	Minimum Security Clearance
36.0 Cloud Services (and subsections)	Applies to all functions	Secret
37.0 Reserved		
38.0 Administrative Office Services (and subsections)	Applies to all functions	Secret
39.0 Operations & Maintenance Services (and subsections)	Applies to all functions	Secret
44.1 Threat and Vulnerability Management Services	Analysis and communication of threat and vulnerability information; Security monitoring; Penetration testing;	Secret Top Secret
44.4 Incident Management Services	Incident management; Digital forensic; Malware analysis	Secret Top Secret Top Secret - SCI
44.5 Security Operations Services	Applies to all functions	Secret Top Secret
44.9 Security Analytics Services	Applies to all functions	Secret Top Secret Top Secret - SCI
47 COMSEC Support	Applies to all functions	Top Secret - SCI
All Other PWS Sections	Applies to all functions	No Secret, Top Secret, Top Secret-SCI required unless specified/required by NASA

The contractor shall submit a list of cleared individuals, along with their proposed function on the contract, qualifications and security clearance level, to the Contracting Officer Representative (COR) within five (5) calendar days of issuance of the CORE and IDIQ task orders. The contractor shall

validate this list again prior to the conclusion of the contract transition. The contractor shall maintain an up-to-date roster of cleared individuals and their security clearance level, and submit this up-to-date roster to NASA immediately upon request.

Prior to on-boarding personnel for positions requiring a security clearance, the contractor shall prepare and submit a Contractor Employee Clearance Document in accordance with DRD 2-3-19-2, Contractor Employee Clearance Document.

DRD	Description	Frequency
DRD 2-3-19-1	Roster of cleared contractor personnel	Within 5days of contract award and immediately upon request
DRD 2-3-19-2	Contractor Employee Clearance Document	Ongoing

3.0 Contract Transition and Stabilization

The contract transition and stabilization period shall be from contract award and will continue for six months. There are several plans, reports and reviews the government requires during the first six months of the contract and these activities shall be well coordinated, tightly integrated, and professionally implemented. The goals will be to provide uninterrupted services to our customers, continuous visibility in to the performance of transition activities, and continued improvement.

Performance incentives for the first six months of the contract will be focused on six areas:

- Technical Preparedness
- Service Operational Readiness
- Program and Project Management Readiness
- Risk Management
- Integration Readiness
- Transition Readiness

For each of the six aforementioned areas, core activities and core deliverables. These activities and deliverables will be required for a formal Transition Readiness Review (TRR) and successful closure of actions from TRR will be required for completion of the Contract Transition.

The core activities and core deliverables for each of the six focus areas are outlined in the table below.

Each focus area could have additional interim activities and deliverables as determined by the contractor and the NASA Procurement Office.

Transition Requirement Area	Transition Activity	Transition Product
Technical Preparedness (TP)		
TP Requirement 1	Technical Readiness Assessment	Deliverable 1: Technical Readiness Report, Part 1 - Assessment Findings and Mitigation Plan Deliverable 1: Technical Readiness Report, Part 2 – Technology Inventory (includes all CI/assets)
TP Requirement 2	Resource Plan and Staffing Activity	Deliverable 2: Part 1 - Resource Management Plan and Staff Plan (includes all resumes) Deliverable 2: Part 2 – Staff plan (includes all resumes) Deliverable 2: Part 3 – Organizational CONOPS Deliverable 2: Part 4 – Interviews of key and critical personnel/roles
TP Requirement 3	Technical Governance Activity	Deliverable 3: Technical Governance Stabilization Plan
TP Requirement 4	Technical Roadmap Development	Deliverable 4: Technical Roadmap (Contract Year 1)
TP Requirement 5	Technical Portfolio Assessment	Deliverable 1: Technical Readiness Report, Part 3 – Technical Portfolio Assessment, Maintenance Plan, and Recommended Improvements
Service Operational Readiness (SOR)		

Transition Requirement Area	Transition Activity	Transition Product
SOR Requirement 1	Assessment of Service Operations (each service)	Deliverable 5: Service Operations Assessment Report
SOR Requirement 2	SLA, OLA, and Performance Review, Findings Determination, and Recommendation (each service)	Deliverable 6: Part 1 – SLA, OLA, and Performance Measures Inventory (for each service) Deliverable 6: Part 2 – Findings Report (for each service) Deliverable 6: Part 3 – Recommendation and Proposed Schedule for Implementing Recommendations (for each service)
SOR Requirement 3	ITIL Framework Review and Continuous Service Improvement Recommendation	Deliverable 7: Part 1 – ITIL Framework Findings Report Deliverable 7: Part 2 – Continuous Service Improvement Recommendation and Plan
SOR Requirement 4	Operational Readiness Planning and Management	Deliverable 8: Part 1- Operational Readiness Plan Deliverable 8: Part 2 - Operational Readiness Report
SOR Requirement 5	MoA Review and Assessment	Deliverable 9: MoA Review Report and Recommendation
Program and Project Management Readiness (PPMR)		
PPMR Requirement 1	Project Management Readiness Review	Deliverable 10: Project Management Readiness Report

Transition Requirement Area	Transition Activity	Transition Product
PPMR Requirement 2	Program Management Readiness Review	Deliverable 11: Program Management Readiness Report
PPMR Requirement 3	Project Management Tool Inventory and CONOPS Planning	Deliverable 12: Part 1 - Project Management Tool Inventory Deliverable 12: Part 2 – Project Management CONOPS
PPMR Requirement 4	Program Management Tool Inventory and CONOPS Planning	Deliverable 13: Part 1 – Program Management Tool Inventory Deliverable 13: Part 2 – Program Management CONOPS
PPMR Requirement 5	Task Order Management and Customer Relationship Management	Deliverable 14: Part 1 – Task Order Management SOP(s) Deliverable 14: Part 2 – Customer Relationship Management SOP Deliverable 14: Part 3 – Contract Level Communications Plan Deliverable 14: Part 4 – Transition Communications Plan Deliverable 14: Part 5 – Customer Satisfaction Survey and Report
Risk Management (RM)		
RM Requirement 1	Risk Management Planning	Deliverable 15: Risk Management Plan

Transition Requirement Area	Transition Activity	Transition Product
RM Requirement 2	Risk Management Tool Inventory	Deliverable 16: Risk Management Tool Inventory
RM Requirement 3	Risk Management Framework	Deliverable 17: Risk Management Framework
RM Requirement 4	Risk Management Readiness Review	Deliverable 18: Part 1 - Risk Management Readiness Report (transition readiness)
RM Requirement 5	Risk Management Reporting	Deliverable 18: Part 2 – Risk Management Report (contract level) Deliverable 18: Part 3 – Risk Management Report and Mitigation Plan (for each service)
Integration Readiness (IR)		
IR Requirement 1	OCA and OCI Preparation	Deliverable 19: Part 1 – OCI Deliverable 19: Part 2 - OCA
IR Requirement 2	Service and Program Integration Assessment and Planning	Deliverable 20: Part 1 – Service Integration Assessment and Plan Deliverable 20: Part 2 – Program Integration Assessment and Plan
IR Requirement 3	Technology Integration Assessment	Deliverable 21: Part 1 - Technology Integration Assessment Report (what technology and tools should be integrated for service operations and reporting)
IR Requirement 4	Data Model and Data Architecture Assessment and Improvement Plan	Deliverable 21: Part 2 – Data Model and Data Architecture Review and Findings Report

Transition Requirement Area	Transition Activity	Transition Product
		Deliverable 21: Part 3 – Data Model and Data Architecture Improvement Plan
IR Requirement 5	Integration Readiness Review	Deliverable 22: Integration Readiness Report
Transition Readiness		
TR Requirement 1	Transition Readiness Review (TRR)	Deliverable 23: Transition Plan and Integrated Schedule

These deliverables along with successful closure of TRR actions and customer satisfaction surveys will form the basis of the incentive fee available.

In support of contractor transition activities, the contractor shall:

- Deliver a detailed integrated schedule depicting status for each of the discrete transition activities
- Ensure uninterrupted service delivery from data center assets
- Ensure uninterrupted IT security surveillance and services
- Ensure software, hardware, application and similar maintenance and license agreements are covered and transitioned
- Ensure application development activities are uninterrupted and that software development assets are transitioned to assure that development effort schedules are maintained
- Ensure projects in development are transitioned in a manner where customer satisfaction will be maintained or improved
- Ensure Operational Level Agreements (e.g. with the NASA Data Center, ACES, NSSC) and Task Orders are signed and in place
- Ensure customer outreach and communication activities are maintained or improved; and
- Ensure deliverables and DRDs and plans are delivered and available
- Ensure that each of the activities for each of the six focus areas are completed

DRD	Description	Frequency
DRD 3-0-1-1	Technical Readiness Report, Part 1 - Assessment Findings and Mitigation Plan	15 days after contract award; updates submitted 20 days after contract award

DRD	Description	Frequency
DRD 3-0-1-2	Technical Readiness Report, Part 2 – Technology Inventory (includes all CI/assets)	20 days after contract award; updates submitted 25 days after contract award
DRD 3-0-1-3	Technical Readiness Report, Part 3 – Technical Portfolio Assessment, Maintenance Plan, and Recommended Improvements	25 days after contract award
DRD 3-0-2-1	Part 1 - Resource Management Plan	5 days after contract award
DRD 3-0-2-2	Part 2 – Staff plan (includes all resumes for all staff allocated to the contract)	5 days after contract award
DRD 3-0-2-3	Part 3 – Organizational CONOPS	10 days after contract award; updates 25 days after contract award
DRD 3-0-2-4	Part 4 – Interviews of key and critical personnel/roles	5 days after contract award
DRD 3-0-3	Technical Governance Stabilization Plan	25 days after contract award
DRD 3-0-4	Technical Roadmap (Contract Year 1)	45 days after contract award; updates 60 days after contract award
DRD 3-0-5	Service Operations Assessment Report	30 days after contract award
DRD 3-0-6-1	Part 1 – SLA, OLA, and Performance Measures Inventory (for each service)	45 days after contract award
DRD 3-0-6-2	Part 2 – Findings Report (for each service)	45 days after contract award
DRD 3-0-6-3	Part 3 – Recommendation and Proposed Schedule for	60 days after contract award

DRD	Description	Frequency
	Implementing Recommendations (for each service)	
DRD 3-0-7-1	Part 1 – ITIL Framework Findings Report	45 days after contract award
DRD 3-0-7-2	Part 2 – Continuous Service Improvement Recommendation and Plan	60 days after contract award
DRD 3-0-8-1	Part 1- Operational Readiness Plan	15 days after contract award
DRD 3-0-8-2	Part 2 - Operational Readiness Report	20 days after contract award
DRD 3-0-9	MoA Review Report and Recommendation	5 days after contract award
DRD 3-0-10	Project Management Readiness Report	10 days after contract award
DRD 3-0-11	Program Management Readiness Report	5 days after contract award
DRD 3-0-12-1	Part 1 - Project Management Tool Inventory	10 days after contract award
DRD 3-0-12-2	Part 2 – Project Management CONOPS	10 days after contract award
DRD 3-0-13-1	Part 1 – Program Management Tool Inventory	5 days after contract award
DRD 3-0-13-2	Part 2 – Program Management CONOPS	5 days after contract award
DRD 3-0-14-1	Part 1 – Task Order Management SOP(s)	5 days after contract award
DRD 3-0-14-2	Part 2 – Customer Relationship Management SOP	10 days after contract award

DRD	Description	Frequency
DRD 3-0-14-3	Part 3 – Contract Level Communications Plan	10 days after contract award
DRD 3-0-14-4	Part 4 – Transition Communications Plan	20 days after contract award
DRD 3-0-14-5	Part 5 – Customer Satisfaction Survey and Report	30 – 60 days after contract award
DRD 3-0-15	Risk Management Plan	10 days after contract award
DRD 3-0-16	Risk Management Tool Inventory	10 days after contract award
DRD 3-0-17	Risk Management Framework	10 days after contract award
DRD 3-0-18-1	Part 1 - Risk Management Readiness Report (transition readiness)	10 days after contract award
DRD 3-0-18-2	Part 2 – Risk Management Report (contract level)	15 days after contract award
DRD 3-0-18-3	Part 3 – Risk Management Report and Mitigation Plan (for each service)	45 days after contract award
DRD 3-0-19-1	Part 1 – OCI	5 days after contract award
DRD 3-0-19-2	Part 2 - OCA	15 days after contract award
DRD 3-0-20-1	Part 1 – Service Integration Assessment and Plan	30 days after contract award; updates due 60 days after contract award
DRD 3-0-20-2	Part 2 – Program Integration Assessment and Plan	15 days after contract award
DRD 3-0-21-1	Part 1 - Technology Integration Assessment Report (what technology and tools should be integrated for	30 days after contract award

DRD	Description	Frequency
	service operations and reporting)	
DRD 3-0-21-2	Part 2 – Data Model and Data Architecture Review and Findings Report	30 days after contract award; updates 90 days after contract award
DRD 3-0-21-3	Part 3 – Data Model and Data Architecture Improvement Plan	30 days after contract award
DRD 3-0-22	Integration Readiness Report	25 days after contract award
DRD 3-0-23	Transition Plan and Integrated Schedule	Available at contract start date with significant weekly updates for the transition period up to Operational Readiness Review and acceptance

Incentive Fee Metric #	Description	Incentive Fee Metric
Incentive Fee Metric T&S – 1 3-0-1	Completion of Actions from Technical Readiness Review (TRR). Outstanding actions from the TRR shall be completed within the required time period	98% of the actions are completed by the due date
Incentive Fee Metric T&S – 2 3-0-2	Stakeholder Satisfaction with Transition and Stabilization. Stakeholder ratings from transition shall	91% meet the criteria

Incentive Fee Metric #	Description	Incentive Fee Metric
	be no less than a "4" on a scale of 1-5 with "5" being the highest	

3.1 Deliverable Development

Each deliverable gives the government and the Contractor a mechanism to achieve desired results. It shall be data-driven, fact-based, implementable, and sustainable. As such, all deliverables submitted shall:

- Align with an identified goal or goals that have previously been concurred in by the Government;
- Identify the required skills needed;
- State that overall implementation can be accomplished within the estimated cost of the contract, or includes an estimated cost and basis of estimate (must provide both to successfully meet this element);
- Discuss technology maturity that can be supported within the current or projected NASA IT infrastructure;
- Include quantifiable short-term objectives that will be accomplished over the succeeding six months and quantifiable long-term objectives that will be accomplished over the succeeding contract or option year;
- Reference all sources of factual data and specific data fields and tables utilized in the analysis and reporting (where applicable); and
- Be delivered and readily available on or before the due date and approved by the government before the conclusion of the transition phase.

3.2 Ongoing Updates and Actions Supporting Implementation of Transition and Stabilization Deliverables

Implementation and execution of are often subject to new requirements, new constraints, and new technology opportunities. The contractor shall address new requirements, new constraints, and new technology as needed by the government during and after contract transition to ensure stabilization of services and support.

Metric #	Description	Metric
Metric 3-2-1	Ongoing Actions for Transition and Stabilization Deliverables	Meets 100% of requirements

Service Level Agreement #	Description	SLA
SLA 3-2-1	Contract, Technology and Resource Requirement Constraint Mitigation	Contractor shall address new tech new constraint new requirements based on agreed delivery dates within 10 days

3.3 Key Personnel and Key Functions/Roles

The contractor shall provide a contract manager who shall be responsible for the performance of the work. The name of this person and an alternate who shall act for the contractor when the manager is absent shall be designated in writing to the contracting officer. The contract manager or alternate shall have full authority to act for the contractor on all contract matters relating to daily operation of this contract. The contract manager or alternate shall be available between 7:00 am to 6:00 pm, Monday thru Friday except Federal holidays or when the government facility is closed for administrative reasons. The following are considered key personnel for the contract (by the government):

- Program Manager
- Deputy Program Manager
- Manager of Project Management
- Chief Solutions Architect
- Application Development Manager
- Systems Engineering Manager
- Data Center Operations Manager
- Test Manager
- Information Security Manager

The descriptions and qualifications below are not necessarily representative of all qualifications, experience, and skills required for the positions. Therefore, the Contractor shall identify staff that meet and exceed the qualifications, experience, and skills described below.

Key Personnel Position	Qualifications
Program Manager	<p>Uses new advanced technologies and applications are required that apply advance principles, theories, and concepts across program requirements. Contributes to the development of new principles and concepts to solve complex highly innovative and ingenious problems. High degree of program coordination required to ensure performance meets all requirements.</p> <p>Bachelor's Degree (preferably in a technical discipline) or equivalent experience and minimum of 15 years of related industry experience or demonstrated effectiveness to meet the managerial expectations. PMP certification counts as 2 years additional experience.</p>
Deputy Program Manager	<p>Uses new advanced technologies and applications are required that apply advance principles, theories, and concepts across program requirements. Contributes to the development of new principles and concepts to solve complex highly innovative and ingenious problems. High degree of program coordination required to ensure performance meets all requirements.</p> <p>Bachelor's Degree (preferably in a technical discipline) or equivalent experience and minimum of 15 years of related industry experience or demonstrated effectiveness to meet the managerial expectations. PMP certification counts as 2 years additional experience.</p>
Manager of Project Management	<p>Exercise full supervision of teams and staff in terms of costs, methods, and employees. Establishes operational objectives and assignments, and delegates assignments to subordinate managers and staff. Works on complex problems where analysis of situations or data requires an in-depth evaluation of various factors. Ensures that budgets, schedules, and performance requirements are met.</p> <p>PMP certification required. A minimum of 15 years technical project management experience. A minimum of 5 years supervisory experience of project managers.</p>

Key Personnel Position	Qualifications
Chief Solutions Architect	<p>Minimum of ten (10) years of verifiable and successful experience in the following:</p> <ul style="list-style-type: none"> • Analyzing and evaluating customer business and technical requirements • Architecting solutions using appropriate technologies which meet functional and non-functional requirements • Documenting, designing, developing and supporting the management of web solutions, cloud-based solution architectures and cloud-based networks • Documenting, designing, developing and supporting the management of custom developed software, and commercial off the shelf (COTS) software • Documenting, designing, implementing and supporting the management of commercial off the shelf software • Defining and maintaining standards, procedures and policies related to Information Technology management • Assessing risk factors and limitations of current systems identifying areas of opportunity for mitigation and improving system performance • Providing technical assessments of current and proposed methodologies for Information Technology management • Providing strategic direction and technical oversight pertaining to the implementation of new tools, technologies, solutions and methodologies • Performing analysis of alternative and market research studies that provide data which aid in the selection of tools, technologies, solutions and methodologies • Overseeing research and development for the application and integration of new tools, technologies, solutions and methodologies into an IT environment • Interpret, implement and adhere to agency and federal level technology standards, policies and directives • In collaboration with other technical leads, participate in problem-solving and root cause analysis efforts • Articulating in writing and verbally the impact of architecturally significant change requests • IT portfolio management to include analysis, infrastructure, cloud transformation, data center consolidation, application development/sustainment • Maintaining knowledge of current and emerging tools, technologies, solutions and methodologies • Providing subject matter expert support to Systems Analysts, Systems Engineers, other Systems Architects, and application teams • Provides detailed development cost, resource, and technology estimates for proposed solutions.
Application Development Manager	<p>Minimum of 10 years software engineering and software development experience. Subject Matter Expert on software engineering and software development standards, best practices, and code constructs, architecture, and design.</p> <p>Minimum of 5 years of software development management experience.</p> <p>Agile and PMP certification required. Strong estimation, system analysis, and testing experience required.</p> <p>Current technology and industry experience is required to support mitigation of technology obsolescence.</p>

Key Personnel Position	Qualifications
Systems Engineering Manager	<p>Establishes information requirements, using analytical methods, for enterprise-wide or large-scale information systems. Designs systems and architectures that include software, hardware, and communications solutions to support the total requirements, as well as provide for present and future cross-functional requirements and interfaces. Ensures architectures are in compliance with open systems standards as they apply to the client's environment. Evaluates compatibility of information system development efforts with agency architectures and recommends adjustments, as appropriate. Evaluates analytically and systematically problems of workflow, organization, and planning and develops appropriate corrective action. Provide consulting support on complex tasks and supervision and direction to Systems Engineering staff.</p> <p>A minimum of 10 years' experience.</p>

Data Center Operations Manager	<p>Minimum of 15+ years of experience in the following:</p> <ul style="list-style-type: none"> • Experience with Data Center consolidation and modernization through the use of server virtualization and Cloud Computing solutions. • Direct the planning, coordination, implementation and execution of approved policies, programs and services related to Data Center services. Serve as the IT technical project lead/task manager and assist with systems implementation. • Deep knowledge of Data Center Management, including design, infrastructure (hardware, software and telecommunications), maintenance and operations. • Oversee operations-related projects. Lead Datacenter projects and activities to ensure they are delivered to meet the requirements. • Oversees the day-to-day operation of NASA HQ IT infrastructure. Work with IT operations and assist with anticipate problems, events and incident management, change management, and problem management. • Experience with monitoring tools such as Solarwinds, and Nagios. Responding to Data center problems resulting from catastrophic events, incident response and power outages. Assist with the execution of the disaster recovery plan when a business or IT operations disruption occurs. • Assist with infrastructure devices hardening guidelines, policies, configuration standards and best practices for NASA network. Review policy and procedure and ensure all IT systems and services are remain in compliance with agency, policies and guidelines. • Experience in Server Virtualization; Server Consolidation; understanding in managing Cloud Environments through the Amazon Web Services and be able to assist with moving applications, web sites and services to the Amazon Cloud environment. • Experience with infrastructure components, including but not limited to: Microsoft Server 2008 R2 & 2012 R2, Linux and UNIX, NetApp data storage, Active Directory and GPO management and design, Virtualization (VMware), and AWS cloud services. • Experience in managing staff to support daily operational tasks, projects/activities to ensure they are delivered on schedule and to meet the customer's requirements. Leads and directs staff that provide IT services. Assigns work and establishes priorities. Supervises staff on performance of tasks and activities. • Experience with change and configuration management process and ensure that modifications are consistent with infrastructure and application architecture specifications as well as security policies. Review and evaluate System Change Request and ensure the successful implementation of system changes. • Knowledge with managing Data Center space & power utilization including understanding Data Center HVAC, Power Distribution, Data Center UPS, Cable Plant Layout, Environmental monitoring systems and commissioning/decommissioning of devices and servers in Data Center. • Experience with inventory of Data Center devices and ensure to have spare part to support disaster recovery in case of device failure. Provide asset management for IT hardware, software, and equipment. • Experience with Data Center documentation including new facility diagrams, floor space, rack space, wiring diagrams, patch panels, and cable management.
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Key Personnel Position	Qualifications
	<ul style="list-style-type: none"> • Review Standard Operating Procedure (SOP) and to ensure staff follow and carry out the operations correctly. Develop, and update documents and SOPs for production services. • Experience in managing datacenter physical environment, security (physical/logical), and ensure NASA HQ policies are followed. Maintain & update physical access procedures for the data centers. • Experience in preparing and managing of the KPI reports and metrics across all services within Data Center. Monitor the Data Center infrastructure, to ensure responsiveness and availability is maintained in accordance with SLAs. Monitor service area Metrics and review and validate all performance reports. • Analyze existing operations and make recommendations for the improvement and growth of the Data Center infrastructure and IT systems. Conduct research and remain current with the latest technologies and solutions in support of procurement efforts. Researches and identifies state-of-the-art technologies that could enhance IT operations, services, and performance of systems and components. • Knowledge and solid understanding of industry best practices. Develop long term vision of technologies and solutions. Provide technical and technology solutions advice recommendations to Government. • Good knowledge with ITIL process frameworks as a best practices to support services as prescribed by the Service Operation Lifecycle and Service Management and continual process improvements. • Meeting with Government on project status and service delivery and to assist in predicting future infrastructure and application capacity needs. • Support the acquisition of Data Center hardware, software, equipment and supplies in order to meet operational requirements. Develop business case justifications and cost/benefit analyses for devices in Data center. • Provide IT engineering expertise for the development and delivery of upgrades, technology refresh, enhancements and replacement of IT systems and services. • Strong written and verbal communication skills.

Key Personnel Position	Qualifications
Test Manager	<p>Minimum of 15 years' experience in:</p> <ul style="list-style-type: none"><li>• Evaluating, recommending, and implementing automated test tools and strategies.<li>• Designing, implementing, and conducting test and evaluation procedures to ensure system requirements are met.<li>• Developing, maintaining, and upgrading automated test scripts and architectures for application products.<li>• Writing, implementing, and reporting status for system test cases for testing.<li>• Analyzing test cases and provides regular progress reports.<li>• Serving as a subject matter expert in providing testing know-how for the support of user requirements of complex to highly complex software/hardware applications.<li>• Directing and/or participating in all phases of risk management assessments and software/hardware development with emphasis on analysis of user requirements, test design and test tools selection.

Key Personnel Position	Qualifications
Information Security Manager	<p>Minimum of ten (10) years of verifiable and successful experience in the following areas:</p> <ul style="list-style-type: none"> • Expert understanding of cybersecurity and information security principles, methodologies, requirements and solutions. • Knowledge of current and emerging cybersecurity and information security tools, technologies, solutions and methodologies. • Knowledge and solid understanding of security industry best practices. • Deep understanding of, and experience in applying, Federal Information Processing Standards (FIPS) and National Institute of Standards and Technology (NIST) Special Publications (800 series) on Computer Security. • Expert understanding of, and experience in applying, the NIST Risk Management Framework and Government Information Security Continuous Monitoring requirements and best practices. • Interpreting, implementing and adhering to Agency and Federal standards, policies and directives. • Analyzing and evaluating customer requirements and developing solutions to securely meet requirements. • Providing management and high-level technical oversight for the implementation and operation of cybersecurity and information security tools, technologies, solutions and methodologies. • Managing a team of cybersecurity and information security professionals supporting daily operational tasks, security services delivery, projects and initiatives. Ensuring that activities are completed and delivered on schedule and meet the requirements. Recruiting, hiring and retention of highly qualified cybersecurity and information security professionals. Assigning work and establishing priorities. Supervising staff on performance of tasks and activities. • Providing cybersecurity and information security subject matter expertise and support to the Government and to other contractor personnel. • Collaborating with other technical leads to solve problems and conduct root cause analysis. • Defining and maintaining organizational standards, procedures and policies related to cybersecurity and information security. • Assisting the Government in predicting future cybersecurity and information security needs and developing strategic direction in cybersecurity and information security. • Providing detailed development cost, resource, and technology estimates for proposed solutions, and providing status updates on projects and service delivery. • Excellent written and verbal communication skills.

The following are considered key functions/roles for the contract (as identified/defined by the government):

- Application Architect
- Database Architect and Manager
- Technical Portfolio Manager
- Asset Manager
- QC Specialist
- On-boarding and Off-Boarding Lead
- Configuration Manager
- Financial Analyst
- Knowledge Management Specialist
- Enterprise Architect

Key functions/roles are defined as functions that support critical IT functions, processes, and integration required across the various levels of management (program, service, and project) that affect the delivery

and operations of services across the contract. Key functions/roles are not defined key personnel; however, the Contractor shall provide staff with the expertise in the functional areas specified. The descriptions and qualifications below are not necessarily representative of all qualifications, experience, and skills required for the roles. Therefore, the Contractor shall identify staff that meet and exceed the qualifications, experience, and skills described below.

Key Role	Qualifications
Application Architect	<p>Minimum of seven (7) years of verifiable and successful experience in the following:</p> <ul style="list-style-type: none"> • Designing major aspects of the architecture of an application, including such components as user interface, middleware, system integration, and infrastructure • Creating application and system integration architecture standards • Communicating both verbally and in writing all architecture concepts, standards and guidelines to development teams • Providing technical and coaching to the applications development teams • Overseeing progress of development teams to ensure consistency with the application architecture design • Ensuring that developed software meets all requirements for quality, security, modifiability, extensibility, sustainability and scalability • Ensuring that enterprise-wide application design and architecture standards are maintained and adhered to • Perform design and code reviews • Creating, maintaining and analyzing object oriented architecture designs • Documenting, implementing and managing the use of well known architecture design patterns • Analyze business and technical requirements to determine the most appropriate system architecture and design • Maintaining knowledge of existing technology trends pertaining to application architecture design • Developing application design standards and guidelines • Mentoring development team members on best practices.
Database Architect and Manager	<p>Subject-matter expert on database administration, data modeling, data architecture, database design, data cleanup, database performance, etc. Ability to lead application development staff on data management, data architectures, database management facilities/utilities/tools, analyzes database, performs database tuning. Experience in configuring, developing, and maintaining automated tools for database design, configuration, implementation, testing, and monitoring. Ability to develop, maintain, and document JCL, shell scripts, and batch processes. Ability to provide database security, backup, and recovery support. Ability and experience with utilizing data masking tools. Experience installing databases and related software. hands on experience with database performance testing is critical. Develops logical data models, physical database designs, identifying and defining database design alternatives and configuration options. Hands on experience evaluating and analyzing SQL statements for trouble shooting and root cause analysis. Understands database concepts such as replication or parallel operations.</p> <p>Expertise in current industry/market database software. Minimum of 10 years' experience.</p>
Technical Portfolio Manager	<p>Subject-matter expert on specific aspects of portfolio management.</p> <p>Minimum of 10 years' experience in portfolio management, defining/establishing the portfolio management framework, managing a program portfolio, and with assessing portfolio health. Knowledgeable of OMB portfolios and accounting requirements.</p>

Key Role	Qualifications
Asset Manager	<p>Minimum of 5 years experience in:</p> <ul style="list-style-type: none"> • Leading the development and implementation of an asset management (AM) framework and program. • Providing innovative approaches to implementing and structuring asset management to be in full compliance with applicable federal, policy, and regulatory guidance. • Leading the management and oversight of the client's organizational assets and the routine inventory of assets and attributes. • Supporting the review, development, and implementation of audit preparation checklists, guidelines, templates, scorecard, and materials to ensure the client meets mandated audit requirements. • Leading a team conducting an ongoing review and assessment of the acquisition, storage, distribution, use, and replacement of information technology assets to ensure the client stays compliant within the CSDP and audit ready.
QC Specialist	<p>Minimum of five (5) years of verifiable and successful experience in the following:</p> <ul style="list-style-type: none"> • Formulating and maintaining quality control objectives • Developing quality control metrics used to measure effectiveness/progress in areas of responsibility • Making recommendations for changes to processes, procedures or policies based on review of quality control metrics • Creating and implementing inspection criteria and procedures • Performing quality testing and inspection activities • Maintaining records and documents related to quality assurance • Interacting with process leaders to oversee, develop and maintain standards and quality control measures • Promoting quality control/assurance awareness and training • Preparing quality control bench marking assessment and findings reports • Conducting audits against project deliverables using defined success criteria • Developing and Planning Process improvement actions from analysis and audit data
Onboarding and Off Boarding Lead	<p>Minimum of 5 years experience with federal onboarding (and offboarding), suitability, clearance, and related processes, regulations, and requirements.</p> <p>Develops, improves, and manages processes for onboarding and offboarding.</p> <p>Performs an assessment of contractor, GFE, and government provided equipment, software, licenses, records and other related artifacts and data to ensure awareness of onboarding and offboarding deficiencies, risks, and applicable mitigations.</p>
Configuration Manager	<p>Minimum of 10 years' experience in configuration management as a subject matter expert. Five years management experience.</p>
Financial Analyst	<p>10 or more years' experience on cost, budget, and invoicing for the contract. Strong management of accounting, budget, and costs.</p> <p>Subject-matter expert on specific aspects of the financial management.</p>

Key Role	Qualifications
Knowledge Management Specialist	Develops processes and technical solutions for the identification, categorization, review/approval, maintenance & management, and retirement of knowledge, information, and data. Provides support on knowledge retention and transition planning to ensure improved communications. 10 + years of knowledge management experience.
Enterprise Architect	Provides high-level architectural expertise to managers and technical staff. Develops architectural products and deliverables for the enterprise and operational business lines. Develops strategy of system and the design infrastructure necessary to support that strategy. Provide subject matter expertise and guidance on selection of technological purchases with regards to processing, data storage, data access, and applications development. Sets standards for the client/server relational database structure for the organization (SQL, ORACLE, SYBASE, etc.). Assessments of feasibility of potential future projects to management. Masters Degree in Computer Science, Information Systems, Engineering, Business, or a related field and/or equivalent work experience. Eight (8) years' experience in planning, analysis, design, and construction of information systems on an enterprise-wide basis or across a major sector of the enterprise.
Risk Management Manager	Subject matter expert in risk management and decision analysis. Minimum of bachelors degree with 10 years professional experience.

4.0 Portfolio Management (PfM)

ITCD has established IT Portfolio Management to align with the overview mission and strategic goals of the organization. Reducing operational costs and the terminating unhealthy projects that can affect an overall IT portfolio is critical. A healthy IT Portfolio provides the means to redirect funding, and deliver meaningful IT functionality while enhancing the security of information systems; therefore, PfM is a cornerstone for the successful execution of this contract.

The contractor shall review the current IT Portfolio Framework; make recommendations to support the continuous development, and maturity of the ITCD Portfolio Plan. The contractor shall assist ITCD with the ongoing management, maintenance, and execution of IT Portfolio Management.

The contractor shall provide continued management support, analysis, process, and technology enhancements to support this integral discipline to choosing and managing the best investments to support the mission of ITCD. The analysis shall include recommendations that will inform the budget process and help ITCD to eliminate waste and duplication within the ITCD portfolio.

The Contractor shall implement best practices, pertaining to (but not limited to): monitoring, reporting, auditing, enhancement, and maturity of the ITCD portfolio while providing portfolio management and analysis. Under this contract the Contractor shall accept responsibility, be, and provide follow on support and services to the existing ITCD Portfolio framework to satisfy current and future requirements outlined in this Performance Work Statement.

The scope of these activities shall involve working with ITCD for IT Portfolio Manager, and require collaboration with other contract staff currently assisting with IT Portfolio Management related activities, Portfolio management also includes, but is not limited to, the following characteristics:

- Leadership – The Contractor’s portfolio management team should lead its team by example toward the successful accomplishment of its mission, despite the problems that any program/project will encounter. Leadership implies more than managerial skills. It includes looking ahead to see the big picture, anticipating potential problems, resolving them as quickly as possible, and providing the environment that enables the team to be successful. Commitment to excellence and respect for team members and partners are strong elements of leadership
- Communications – The Contractor is responsible for doing its part to facilitate productive communications among all parties, including the Government, customers, and other service providers.
- Managing Relationships – Building and maintaining effective relationships with stakeholders is critical to success of this program. Stakeholders include HQ management, customers, other NASA Centers, and other service providers that depend on services performed under this contract.
- Teambuilding – A strong, integrated Government-Contractor team is supportive and proactive. Good portfolio management includes strategies to keep the team together and working toward mutual goals.
- Institutional Support – Although technical expertise critical, it is also imperative the Contractor possess a strong organization with access to highly skilled resources and a plan for back-filling staff as a factor to achieve the effective management, and operation of ITCD’s portfolio management.

The HQ IT Support Services (HITSS) Contractor shall support the ITCD Portfolio Management in the following areas:

- a. Provide expert level support and value-added guidance to Headquarters in developing cost effective solutions for the ITCD Portfolio requirements;
- b. Provide an IT environment that fosters development of custom applications in a robust and evolving environment and takes full advantage of industry standards and emerging technologies relating to Portfolio Management;
- c. Support IT requirements that utilize specialized IT skills and knowledge of technology trends to increase user productivity and efficiency as related to IT Portfolio management;
- d. Provide excellent customer service for a variety of IT disciplines and functional areas;
- e. Incorporate IT security in all aspects of the work to ensure protection of NASA Headquarters’ data and systems;
- f. Effectively collaborate with other Headquarters and Agency IT Contractors to provide seamless services in support of ITCD leadership; and
- g. Ensure that all IT activities meet all applicable Federal (such as OMB, OPM, FITARA, etc.), Agency, and Headquarters requirements.

The Contractor shall leverage opportunities for the support of the ITCD Portfolio and its maturity to meet NASA's mission. To accomplish this, the Government expects that the Contractor shall achieve and (where feasible) exceed on the following requirements:

- Support continuous evaluation, analysis of the identified controls and outputs required for IT Portfolio Management and provide recommendations for technical advances and remedies that increase efficiencies and cost savings;
- Collaborate and integrate with ITCD and contractor support team to continue to further define the enablers (ITCD staff, tools, etc.) required to support ITCD IT Portfolio Management and make recommendations for the existing framework;
- Support analysis of existing controls for implementation and for proper maintenance and integrity of IT Portfolio Management processes, data, governance, and reporting;
- Provide continuous support to ITCD and contractor support team to define metrics/measures (programmatic level; tied to the strategic plan, 100 day plan, etc.) for IT Portfolio Management for continuous improvement;
- Support, identify, and recommend forward – thinking technical solutions to enhance portfolio management and best practices;
- Recommend best practices to sustain the portfolio management, processes, adherence, and track metrics;
- Identify, recommend and support improvements to the portfolio management framework, process execution, management and monitoring of data and related metrics/reporting;
- Support existing training plans and or recommend improvements for portfolio management by identifying training needs and mechanisms for delivery of training and application of training to ITCD's portfolio and related processes;
- Analyze ITCD's portfolio to ensure best practices. Implement and to ensure appropriate utilization of, management of, maintenance of, and enhancement of ITCD's portfolio.

The Contractor shall be required to remain knowledgeable in the field of IT PfM by obtaining certifications, attending trainings, and staying abreast of how other government agencies and private industry are executing IT PfM. Analysis, evaluation, and recommendations regarding PfM best practices are required and recommendations for competences to provide an adept portfolio. Likewise, the contractor shall determine training gaps that shall be addressed for government staff, develop training content and related materials, and deliver training to government and contractor staff. The contractor shall maintain the Portfolio Management training plan to ensure structured, thoughtful, meaningful, and timely training.

DRD	Description	Frequency
DRD 4-0-1	Portfolio Management Transition Plan	30 days upon contract award
DRD 4-0-2	Portfolio Management Training Plan Update	90 days upon contract award

DRD	Description	Frequency
DRD 4-0-3	Portfolio Management Framework Updates	As required based on DRD 4-0-5; otherwise upon request
DRD 4-0-4	Portfolio Management Training and Related Materials	As needed based on ITCD Portfolio Health Check, portfolio data, and data integrity
DRD 4-0-5	ITCD Portfolio Management Framework Analysis and Report	60 days upon contract award, semi-annually thereafter
DRD 4-0-6	Investment Selection and Prioritization Criteria and Process	Updates due upon request or as required based on Health Check findings

4.1 Portfolio Management – Concept of Operations (CONOPS)

The Contractor shall be responsible to provide Portfolio Management CONOPS requirements to include but not limited to the continuous support services required for the organization, management and running of the IT PfM framework in the division, maintaining the Portfolio Management application, and making recommendations to ITCD Leadership for process or technology improvements. The Contractor shall collaborate with the Project and Service Managers in ITCD and the ITCD contractor staff to populate the CA PPM tool with relevant performance data and preparing for Control Gate Reviews. Support services shall also consist of collaboration on developing the communication plan to assist the Project and Service Managers adjust to the new guidelines and requirements needed to support an IT PfM framework.

The Contractor shall be responsible for continuous support services in support of ITCD's leadership, Financial Manager, and PfM team to manage the day-to-day operations of portfolio management processes.

DRD	Description	Frequency
DRD 4-1-1	Portfolio Management CONOPS Updates	Updates required based on the ITCD Portfolio Health Check, Otherwise due upon request
DRD 4-1-2	Roles and Responsibility Matrix	Updates due monthly
DRD 4-1-3	Portfolio Management System Access and User Role Audit and Report	Monthly

4.2 Portfolio Management – Metrics, Performance Measurement, and Health Check

Implementation of consistent portfolio performance measures and measuring performance at regular intervals is vital for ITCD to monitor portfolio health, as well as to assess the performance of specific programs, projects, services, and assets. The Contractor shall perform continuous support, assessment, and execution of the existing groundwork established to capture the IT portfolio management performance metrics that provide ITCD leadership the capability to track portfolio management, demonstrate how it contributes to accomplishing ITCD strategic goals, objectives and initiatives, understand the performance of IT investments, and make informed decisions on selecting, modifying, and decommissioning IT investments.

The Contractor shall collaborate with ITCD leadership and the PfM team to prepare a Metrics Plan to provide the ITCD Portfolio Health Check on a continuous basis by precise, accurate, and timely reporting and facilitating reviews. The Metrics and Performance Measurement Plan shall provide guidance and requirements for performing, managing, analyzing, and maintaining portfolio data for the following reporting cycles:

- Short-Cycle (Monthly) – for proactive corrective actions
- Intermediate (Quarterly) – for proactive process improvements and cost management
- Long-Cycle (Annually) – for Total Cost of Ownership and ROI reviews and assessments

DRD	Description	Frequency
DRD 4-2-1	Monthly Health Check	Monthly
DRD 4-2-2	Intermediate Health Check	Quarterly
DRD 4-2-3	Long-Cycle Health Check	Annually
DRD 4-2-4	Metrics and Performance Measurement Plan	Updates due quarterly
DRD 4-2-5	Monthly Health Check Report and Mitigation Plan	Monthly
DRD 4-2-6	Intermediate Health Check Report and Mitigation Plan	Quarterly
DRD 4-2-7	Long-Cycle Health Check Report and Mitigation Plan	Annually
DRD 4-2-8	Metrics and Performance Measures	Reported Monthly

4.3 Portfolio Management - Risk Management

The contractor shall refine, manage, enforce, and maintain the Risk Management Plan, processes, and related criteria for maintenance and management of the ITCD Portfolio. The Contractor shall provide continuous monitoring of the existing Risk Mitigation Plans that support the Risk Management Plan associated with the ITCD Portfolio, IT investments, risk management plans associated with IT investments.

DRD	Description	Frequency
DRD 4-3-1	Portfolio Risk Management Plan	Updates due Quarterly
DRD 4-3-2	Risk Model and Formulation for the Portfolio	Updates due Quarterly
DRD 4-3-3	Risk Report	Monthly
DRD 4-3-4	Risk Mitigation Plan	Monthly

5.0 Program Integration Services

Program and service integration is required for effective and proactive Information Technology (IT) Management. The major goals of NASA HQ ITCD for program and service integration are to:

- Identify and define integration requirements and dependencies across all services and programs;
- Develop and implement appropriate and effective management and monitoring processes to ensure and support service integration and program integration;
- Establish Service Level Agreements to ensure improved service and program operations;
- Identify, manage, and address service capacity and service demand as well as related issues and risks;
- Establish service models to ensure clear and concise service deliverables, operations, and costs (internal and external).

The Contractor shall provide expertise, support, and services that assist NASA HQ ITCD with achieving the aforementioned goals as well as the related and supporting requirements below and throughout this PWS.

The contractor shall provide services and support for the NASA HQ ITCD's Program Integration Services team in the management of services, programs, governance, risk, contract integration, portfolio management, project management, service integration, program integration, MoAs for service delivery, and performance, budget and cost management, knowledge management, and service capacity and demand as well as with the sustainment of integration of services and solutions provided by each service. The contractor shall ensure that the sustainment of integration of services and solutions are executed and managed through ITIL as well as other processes and frameworks established by the federal government, NASA, HQ ITCD, and industry.

5.1 Service and Program Integration

The contractor shall assist and support NASA HQ ITCD in the identification, definition, and management of points of integration, components of integration, and requirements (data, delivery, deliverables/products, and resources) across services (HITSS, HQ, Agency, and federally provided services) and service providers. The contractor shall maintain an inventory of all service domains, service categories, services, service models, service providers/contracts, dependencies, integration

requirements, data requirements, related metrics and performance measures, and related deliverables. The contractor shall utilize NASA HQ ITCD provided system for data capture and for managing aforementioned data. The contractor shall manage and maintain the service portfolio and an inventory of services including the service domains and categories in coordination with the CTO, Systems Engineering and Implementation Manager, and the Technology Services and Solutions branch in support of the service catalog and related activities. Although the CTO, Systems Engineering and Implementation Manager, and the Technology Services and Solutions branch are specifically referenced for service and program integration, the contractor shall provide similar services across ITCD and shall ensure these services and related products are vetted through the appropriate governance processes and entities.

The contractor shall analyze service integration points, program integration points, dependencies, and metrics to identify potential corrective actions and risks that should be addressed in the service portfolio and to make recommendations on mitigations.

DRD	Description	Frequency
DRD 5-1-1	Service Portfolio and Inventory System Updates	Ongoing
DRD 5-1-2	Assessment and Report of Service Integration, Integration Requirements, Dependencies, and Risks	Monthly
DRD 5-1-3	Metrics Management	Ongoing
DRD 5-1-4	Service Integration Risk Report	Monthly
DRD 5-1-5	Program Integration Risk Report (includes service capacity and service demand issues identified)	Monthly
DRD 5-1-6	Risk Mitigation Recommendation	Monthly
DRD 5-1-7	Service and Program Integration Improvement Plan	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery

DRD	Description	Frequency
DRD 5-1-8	Service and Program Integration Improvement SOP	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 5-1-9	Service and Program Integration Framework and Processes	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 5-1-10	Inventory of Service Models and Updates	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 5-1-11	Sustainment Plan and SOP for Service and Program Integration	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery

5.2 Service Level Agreements and Memorandum of Agreements

The contractor shall assist and support NASA HQ ITCD in the definition, management, and maintenance of service level agreements, memorandum of agreements, and service cost models across services (HITSS, HQ, Agency, and federally provided services) and service providers. The contractor shall maintain an inventory of all service level agreements, memorandum of agreements, and service cost models. The contractor shall utilize NASA HQ ITCD provided system.

DRD	Description	Frequency
DRD 5-2-1	Inventory of SLAs (across all services) (across all services and contracts/task orders utilized and/or established by ITCD)	Due 60 days upon contract award; quarterly thereafter unless government requests more frequent delivery
DRD 5-2-2	Inventory of MoAs (across all services and contracts/task orders utilized and/or established by ITCD)	Due 60 days upon contract award; quarterly thereafter unless government requests more frequent delivery

DRD	Description	Frequency
DRD 5-2-3	Service Cost Model Inventory	Due 60 days upon contract award; quarterly thereafter unless government requests more frequent delivery
DRD 5-2-4	Service Cost Model Definition and Management Plan (for each service sponsored, managed, and/or provided by ITCD)	Due 60 days upon contract award; quarterly thereafter unless government requests more frequent delivery
DRD 5-2-5	SLA and MoA Inventory Updates (for each service sponsored, managed, and/or provided by ITCD)	Ongoing
DRD 5-2-6	Service Cost Model Inventory Updates (for each service sponsored, managed, and/or provided by ITCD)	Ongoing
DRD 5-2-7	Service Cost Model Updates (for each service sponsored, managed, and/or provided by ITCD)	Ongoing
DRD 5-2-8	SLA and MoA Updates (for each service sponsored, managed, and/or provided by ITCD)	Ongoing
DRD 5-2-9	Service Cost Model Definition and Management Plan Updates (for each service sponsored, managed, and/or provided by ITCD)	Ongoing
DRD 5-2-10	Service Cost Model Assessment and Recommendation Report	Due 60 days after contract award; Monthly thereafter
DRD 5-2-11	SLA, MoA, Service Cost Model System Maintenance and Enhancements	Upon request

6.0 Project Management

Effective planning, coordination, execution, monitoring, and management of work requests and related tasks are critical to the management of work, work requests, and projects. The Contractor shall plan, coordinate, execute, monitor, and manage work, work requests, and projects utilizing project management expertise for IT projects and IT management. The Contractor shall follow ITCD's Project Management Framework; utilize ITCD's project management, work management, and IT request management systems; comply with NASA's Procedural Requirements (NPRs) such as NPR 7120.7, NPR 7120.8, and other related NPRs providing guidance on the planning, execution, and management of projects; and shall follow an established software development lifecycle in conjunction with project management standards and practices.

The contractor shall have existing tools and techniques for estimation, work breakdown, resource assignments, risk and issue management, cost management, etc. The existing tools and techniques utilized and employed by the Contractor shall complement NASA HQ ITCD's established project management framework and governance structure. The Contractor shall measure progress and shall establish success criteria to achieve successful completion of project goals and objectives for each project.

ITCD requires project management and tracking support for both internal and external projects. Internal projects are projects that are directly assigned to the Contractor by ITCD. An internal project could be a project sponsored by any HQ office and have a significant IT content. In providing this support and in executing projects, the Contractor shall use the governing documents, templates specified by the requiring HQ office and by NASA HQ ITCD.

External projects are projects where the implementation lead is not the HITSS Contractor but where the Contractor shall be responsible for coordination, participation, or analysis. The Contractor shall provide input, content, comments, and recommendations on project plans prepared by other Contractors including the Agency's strategic sourcing contractors, and other stakeholders or other Government agencies, or other Government agencies. The contractor shall also provide data required and shall provide support to NASA HQ ITCD and other HQ organizations for successful planning, execution, and management of external projects.

The Contractor shall provide services, and support in meeting the following objectives for project management in NASA HQ ITCD, which include but are not limited to:

- Guide key (IT) projects to a successful conclusion
- Create a foundation for consistent project success throughout the organization
- Achieve this through development of a strong and pervasive project management discipline within the organization's project teams
- Support the ITCD Project Selection process

- Establish Performance Focused Project Environment: all projects for which the Contractor is accountable for successful delivery, will be regularly monitored, and measured for performance using Earned Value (EV) or some other performance calculation. All projects will regularly self-monitor performance and share these performance measurements with Project Sponsors and Stakeholders
- Build Project Management Discipline and Professionalism
- Keep ITCD's management team, Project Management Office, technical monitors, and project leads/managers informed of project status
- Report to Portfolio Management Office on:
 - Enterprise, non-enterprise, O&M, and other projects
 - Special projects
 - Metrics that measure project management execution
 - Issues and opportunities
 - Provide reporting to the IRB
 - Maintain the project management and PMO software
- Support and contribute to NASA HQ ITCD's Project Management Methods and Practices
 - Support and assist with maintenance of IT Project Management methodology and standards
 - Maintain Project Management best practices, standards, and policies for maintenance of the ITCD PM framework and associated policy, procedures, processes, metrics, and templates for and for integration of the framework with other IT frameworks utilized by ITCD such as ITIL, portfolio management, NASA NPRs/NPDs, PMBOK, and Agile Scrum framework; the contractor shall have knowledge of system engineering life cycle, project management, and agile methodologies
- Collaborate with Portfolio Management Office to ensure inclusion of projects and project dollars in the ITCD portfolio
 - Work with the IRB and the Portfolio Management Office to make the IT project-selection process successful
 - Maintain and publish a master IT projects schedule, including critical milestones
 - Perform project resource management
 - Alert the Portfolio Office of IT projects at risk and provide recommendations.
 - Perform capacity planning with Investment Portfolio Office so that ITCD makes optimal use of its resources
 - Regularly monitor and measure project performance
 - Work with the ITCD Project Managers, ITCD PMO, ITCD Technical Leads, and Project Sponsors to make adjustments to under-performing projects
 - Manage all ITCD's IT projects either directly or indirectly

DRD	Description	Frequency
DRD 6-0-1	Utilization, population, submission, update, maintenance, storage, management, and tracking of project data, information, and related artifacts, templates, documents, correspondence	Ongoing with each project throughout the project lifecycle and in accordance with the NASA, HQ ITCD, and industry project management methodology, frameworks, requirements, policies, processes, and SOPs
DRD 6-0-2	Meeting Minutes (to be stored in a repository approved by NASA HQ ITCD)	Each Meeting
DRD 6-0-3	Project Management Framework Updates	As requested by the ITCD PMO and/or HQ ITCD
DRD 6-0-4	Project Management SOP Updates	As requested by the ITCD PMO and/or HQ ITCD
DRD 6-0-5	Project Management Processes	As requested by the ITCD PMO and/or HQ ITCD
DRD 6-0-6	Project Management System Maintenance	As requested by the ITCD PMO and/or HQ ITCD
DRD 6-0-7	Project Management Training Plan Updates	As requested by the ITCD PMO and/or HQ ITCD
DRD 6-0-8	Project Management Training	As required per contractor transition and onboarding procedures

6.1 Project Management – Planning and Execution

The contractor shall ensure that projects are executed in accordance to NASA HQ ITCD's Project Management Framework, NPR 7120.7/8, ITCD's systems engineering framework, NASA system engineering policies, NASA ITCD's software development methodologies, NASA HQ ITCD's portfolio management framework and processes, NASA HQ ITCD's governance model, and software management guide. The NASA ITCD Project Management framework will provide guidance for types of projects, sizing of projects, project templates, and project data required for planning and execution.

The contractor shall ensure that new and existing Service Level Agreements (SLAs), Operational Level Agreements (OLAs), contract and task order requirements, performance measures, reliability, availability, maintainability, and interoperability requirements and agreements are addressed, planned for, managed, and implemented/supported with each project.

6.2 Project Management –Earned Value Management and Monitoring

The contractor shall collect and report earned value management data for (but not limited to) each project and work request.

When required by IDIQs, earned value shall be established, collected, tracked, analyzed, and reported at the task level (detail and summary level tasks), work request level, and project level.

For the CORE task order of this contract, the Contractor shall calculate earned value utilizing the NASA HQ ITCD project management application. The Contractor shall calculate earned value through calculations and configuration implemented in the NASA HQ ITCD project management application. The following metrics will be monitored by the Contractor:

- Schedule Variance (SV)
- Cost Variance (CV)
- Schedule Performance Index (SPI)
- Cost Performance Index (CPI)
- Estimate At Completion (EAC)
- Earned Value (EV)
- Planned Value (PV)
- Estimate to Completion (ETC)
- Budget at Completion (BAC)

The contractor shall have an established practice/framework of earned value management to ensure accurate collection, maintenance, and management of the following (but not limited to):

- Schedule Variance (SV)
- Cost Variance (CV)
- Schedule Performance Index (SPI)
- Cost Performance Index (CPI)
- Estimate At Completion (EAC)
- Earned Value (EV)
- Planned Value (PV)
- Estimate to Completion (ETC)
- Budget at Completion (BAC)

When required by IDIQ, the contractor shall perform earned value management and monitoring for all projects. The contractor shall ensure that earned value data is collected, managed, and analyzed across all software development methodologies employed for NASA HQ ITCD projects.

The Contractor shall be competent in project planning, work estimation, and project estimation capabilities to ensure meaningful project and EVM data.

DRD	Description	Frequency
DRD 6-2-1	EVM Data (as generated in the NASA HQ ITCD project management system)	Daily
DRD 6-2-2	EVM Report	Weekly
DRD 6-2-3	Project Estimation Methodology	30 days after contract award; updates quarterly
DRD 6-2-4	Project Corrective Action Plan	Bi-weekly for each project based on EVM report

6.3 Project Management – Risk and Issue Management

The contractor shall manage project risk in accordance to ITCD Project Management Framework and other NASA regulations and requirements supporting IT management, service delivery, portfolio management, decision analysis, and investment management. The contractor shall have an established risk management discipline and this discipline shall conform to, enhance, and support risk management defined and established by NASA, NASA HQ, and ITCD.

The contractor shall provide a strategy document describing its approach to integrating, supporting, and enhancing NASA HQ ITCD's risk management model, risk management for portfolio management, risk management for project management, and risk management for security.

DRD	Description	Frequency
DRD 6-3-1	Project Risk Data	Daily
DRD 6-3-2	Project Issue Data	Daily
DRD 6-3-3	Strategy Document – Integration of HQ ITCD Risk Management Model, Risk	60 days after contract award; quarterly thereafter

DRD	Description	Frequency
	Management for Portfolio Management, Risk Management for Project Management, and Risk Management for Security	
DRD 6-3-4	Project Risk Report and Mitigation Plan	Ongoing
DRD 6-3-5	Project Issue Report and Mitigation Plan	ongoing

6.4 Project Management – Resource Management and Required Skills

The Contractor shall ensure that contractor staff performing project management work has all of the following experience:

- A minimum of 10 years project management experience planning, estimating, resourcing, executing, monitoring, and managing information technology projects focusing on application development, website development, website redesign, systems engineering, data center consolidation, application redesign and re-platforming, technology upgrades, technology migrations, application migrations, application consolidation, website and application retirement, application archivals, data migrations, business intelligence, COTS implementation, and system integration
- Mastery of MS Project and other scheduling tools
- Demonstrated and validated ability to build project schedules, resource project schedules, manage and maintain project schedules with EVM data. At least 10 years of MS Project experience is required
- Demonstrated and validated ability to plan, manage, execute, and monitor projects requiring utilization and compliance with project management frameworks, systems engineering lifecycles, software development lifecycles (agile, waterfall, etc.), EVM requirements, and program/project/service/application/work/task level cost and schedule estimation, tracking, reporting, and management
- Demonstrated and validated ability to define, review, and contribute to metric data definition, collection, maintenance, and related reporting
- Demonstrated and validated project status and reporting
- A minimum of 10 years' experience with risk management and issue management for IT projects

- Demonstrated and validated ability to address corrective actions and to follow proper escalation protocols and procedures with technical monitors, the COR, the IT organization and with the project sponsor
- Demonstrated and validated ability to plan, manage, execute, and monitor projects requiring integration of several projects, project teams, services, service providers, and/or sponsors/stakeholders
- A minimum of 10 years' experience planning, executing, managing, and monitoring IT projects in a federal environment
- Demonstrated and validated experience performing project management with a practical application of and approach to industry standards and best practices. Knowledge of Project Management Institute standards is required

DRD	Description	Frequency
DRD 6-4-1	Qualified Technical Project Management Staffing Assessment and Report	Ongoing

6.5 Project Management –Metrics

The contractor shall provide data from projects planned and executed. Metrics will be defined in the NASA HQ ITCD Project Management Framework. Data that the Contractor provides shall be analyzed by ITCD, the ITCD PMO, and the contractor to identify corrective actions that the contractor must address to ensure improved project management performed by contractor staff. Likewise, data will be analyzed by ITCD, the ITCD PMO, and the contractor to identify potential updates to the ITCD project management framework pending ITCD governance board approval.

Additional metrics may be defined in an effort to improve and/or update templates and data requirements supporting the framework for either capture of required documentation or for improved data capture in ITCD's project management system.

DRD	Description	Frequency
DRD 6-5-1	Project Management Metrics	Ongoing
DRD 6-5-2	Project Management Metrics Analysis and Report	Monthly

7.0 Standards, Service Level Agreements, and Measurements

The contractor shall demonstrate expertise to provide services and support across all requirements of the contract. To support effective IT Management and delivery, HQ ITCD requires the contractor to identify, define, implement, enforce, manage, and maintain standards, service level agreements, and measurements. Furthermore, it is imperative that the contractor comply with approved and implemented standards, service level agreements, and measurements.

Standards are essential to quality and delivery of services, products, solutions, systems/applications, and infrastructure. Therefore, the contractor shall have established, defined, well-managed and maintained standards to ensure service delivery, operations, product and system/application development, etc.

Service level agreements communicate the scope of services as well as the delivery and availability commitments by which services, products, solutions, systems/applications, and infrastructure shall be provided.

Measurements provide the quantitative requirements and related data that shall be used to determine the overall health, accuracy, quality, reliability, etc. of services, service delivery, service operations, systems/applications, infrastructure, solutions, products, etc.

The aforementioned descriptions and definitions of standards, service level agreements, and measurements are broad and are not comprehensive of all definitions, scope, impact, and data required for this contract. Therefore, the contractor shall address standards, service level agreements, and measurements beyond the descriptions and definitions outlined above.

The contractor shall have standards for each requirement area of the contract, and shall utilize and comply with standards established and defined both by the government and the contractor for each of the requirement areas of the contract. Additionally, the contractor shall continuously review standards (contractor established/defined/developed, government established/defined/developed, and industry defined) to assist the government with managing and maintaining standards by which service operations, service delivery, program management, and IT management are performed with quality, stability, and consistency. As a result, the contractor shall develop a standards library, shall implement a technical solution for the standards library, and shall maintain and manage the standards library. The contractor shall ensure that the standards and related data in the standards library are maintained, are relevant, are accurate, and complementary to the requirements and services provided in this contract.

The contractor shall assist HQ ITCD with defining, implementing, maintaining, managing, and meeting service level agreements established for this contract, IT services, products, and systems/applications, etc. A service level agreement repository shall be developed to track all service level agreements associated with the contract to include but not limited to service level agreements established by other service providers for which HITSS services, operations, systems/applications, etc. are dependent and/or integrated.

The contractor shall assist HQ ITCD with defining, implementing, managing, and analyzing measurements for which services, products, systems/applications, etc. The contractor shall assist HQ ITCD with assessing and evaluating measurements for continuous improvement, health, and operational

efficiencies. The contractor shall have a set of measurements for each requirement area of the contract. The contractor shall also assist HQ ITCD with defining, establishing, and managing measurements for IT management, program management, risk management, portfolio management, etc. A measurements repository shall be established for all services, requirement areas, and program requirements provided on this contract.

The contractor shall develop and implement a framework, a SOP, and processes for standards, service level agreements, and measurements.

Additionally, an audit shall be conducted by the contractor as well as the government and an independent reviewer to ensure that:

- service level agreements are current, managed, maintained, implemented, etc.
- standards are current, managed, maintained, implemented, enforced, etc.
- measurements are managed, analyzed, etc. for continuous improvement and for corrective actions.

The contractor shall perform a validation of standards, service level agreements, and measurements and will report findings. The contractor shall document each service level agreement, standard, and measurement and shall develop templates for standards for consistent data, classification, definition, validation and verification, certification, etc. The contractor shall document each service level agreement, and will develop templates for consistent data, definition, validation and verification, etc. Likewise, the contractor shall develop templates for the measurements established for this contract for consistent validation and verification, etc.

For the purposes of this contract,

- validation activities for service level agreements, standards, and measurements are required to assess, determine, and manage relevancy for service level agreements, standards, measurements, etc.
- audit activities for service level agreements, standards, and measurements are required to ensure compliance, to support risk management, etc.

All technical solutions developed and implemented for the management of standards, service level agreements, and measurements shall be NASA owned and hosted unless otherwise agreed to by the government.

DRD	Description	Frequency
DRD 7-0-1a	Service Level Agreement System	Due 60 days after contract award

DRD	Description	Frequency
DRD 7-0-1b	Service Level Agreement System Maintenance and Updates	Ongoing
DRD 7-0-1c	Service Level Agreement Data Entry and Data Maintenance	Ongoing
DRD 7-0-2a	Standards Management System	Due 60 days after contract award
DRD 7-0-2b	Standards Management System Maintenance and Updates	Ongoing
DRD 7-0-2c	Standards Data Entry and Data Maintenance	Ongoing
DRD 7-0-3a	Service Measurement Management System	Due 60 days after contract award
DRD 7-0-3b	Service Measurement Management System Maintenance and Updates	Ongoing
DRD 7-0-3c	Service Measurement Data Entry and Data Maintenance	Ongoing
DRD 7-0-4a	Service Level Agreement Framework, SOP, and related processes	Due 60 days after contract award
DRD 7-0-4b	Service Level Agreement Framework, SOP, and related process Updates	Ongoing
DRD 7-0-5a	Standards Management Framework, SOP, and related processes	Due 60 days after contract award
DRD 7-0-5b	Standards Management Framework, SOP, and related process Updates	Ongoing

DRD	Description	Frequency
DRD 7-0-6a	Measurement Management Framework, SOP, and related processes	Due 60 days after contract award
DRD 7-0-6b	Measurement Management Framework, SOP, and related process Updates	Ongoing
DRD 7-0-7a	Standards Management Improvement Plan	Due 60 days after contract award; quarterly thereafter.
DRD 7-0-7b	Standards Management Risk Report and Mitigation Recommendation	Monthly
DRD 7-0-7c	Standards Report	Monthly
DRD 7-0-8a	Service Level Agreement Management Improvement Plan	Due 60 days after contract award; quarterly thereafter
DRD 7-0-8b	Service Level Agreement Management Risk Report and Mitigation Recommendation	Monthly
DRD 7-0-8c	Service Level Agreement Report	Monthly
DRD 7-0-9a	Measurement Management Management Improvement Plan	Due 60 days after contract award; quarterly thereafter
DRD 7-0-9b	Measurement Management Risk Report and Mitigation Recommendation	Monthly
DRD 7-0-9c	Measurement Report	Monthly
DRD 7-0-10a	Contractor IT Standards Inventory	To be delivered 10 days after contract award
DRD 7-0-10b	IT Standards Catalog	To be established 10 days after contract award. Maintained monthly with updates to the backlog for the catalog enhancements

DRD	Description	Frequency
DRD 7-0-10c	IT Standards Catalog Backlog	Monthly
DRD 7-0-10d	IT Standards Reference Model	To be delivered 30 days after contract award
DRD 7-0-10e	IT Standards Reference Model Updates	30 days after contract award; thereafter, will be delivered as prescribed by the Enterprise Architecture processes, procedures, change management, and configuration management framework
DRD 7-0-10f	IT Standards Metrics Report/Status Report	Monthly
DRD 7-0-10g	IT Standards Catalog System Maintenance Plan	Quarterly
DRD 7-0-10h	Audit of Standards	Due 30 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 7-0-11	Audit of Service Level Agreements	Due 30 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 7-0-12	Audit of Measurements	Due 30 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 7-0-13	Standards Documentation and Policy (for each service, contract requirement area, etc.)	Initial set of standards due upon contract award; ongoing thereafter
DRD 7-0-14	Service Level Agreement Documentation and Policy (for each service, contract requirement area, etc.)	Initial set of service level agreements due upon contract award; ongoing thereafter
DRD 7-0-15	Measurement Documentation and Policy	Initial set of measurements due upon contract award; ongoing thereafter

DRD	Description	Frequency
	(for each service, contract requirement area, etc.)	
DRD 7-0-16a	Validation and Verification of Standards	Ongoing
DRD 7-0-16b	Validation and Verification of Standards Report	Monthly
DRD 7-0-17a	Validation and Verification of Service Level Agreements	Ongoing
DRD 7-0-17b	Validation and Verification of Service Level Agreements Report	Monthly
DRD 7-0-18a	Validation and Verification of Measurements	Ongoing
DRD 7-0-18b	Validation and Verification of Measurements Report	Monthly
DRD 7-0-19	Analysis of Standards, Service Level Agreements, and Measurements	Ongoing
DRD 7-0-20	Change Management Plan for Service Level Agreements	Due 60 days upon contract award; ongoing thereafter for each each change proposed for service, product, application/system, infrastructure component, technology, process, etc.
DRD 7-0-21	Change Management Plan for Standards	Due 60 days upon contract award; quarterly thereafter (or more frequently as requested by the government)
DRD 7-0-22	Change Management Plan for Measurement Management	Due 60 days upon contract award; ongoing thereafter

Metric #	Description	Metric
Metric 7-0-1	Accurate execution of the service level agreement, standards, and measurement management framework, processes, and procedures	The contractor shall maintain 100% compliance with the frameworks, processes, and procedures implemented for service level agreement, standards, and measurement management

Service Level Agreement #	Description	SLA
SLA 7-0-1	Accuracy of data	The contractor shall maintain 100% accuracy of service level agreements, standards, and measurements

8.0 Performance Management and Metrics Management

In order to maintain alignment of resources, systems, and employees to its strategic objectives and priorities NASA HQ ITCD requires an integrated Performance Management approach. A successful Performance Management capability will effectively and efficiently ensure that the goals of the organization are being met. The contractor shall apply the processes, workflows, and templates identified in the ITCD Performance Management Framework to ensure that ITCD is meeting its goals effectively and efficiently. The contractor shall apply the Performance Management Framework to ITCDs customer needs, as required, to ensure their ability to meet performance goals. The Performance Management Framework consists of four phases: *Define, Design, Develop, and Deploy*.

8.1 Performance Management - Define

The organizations Strategic and Tactical Plan define its vision, mission, goals, and objectives that form the basis for understanding whether it has met performance expectations. The contractor shall develop metrics by reviewing the strategic objectives and identifying which relate, directly or indirectly, to the performance area being evaluated.

8.1.1

Define / Review Strategic Objectives – The contractor shall ensure alignment of the metrics at either the service level or strategic level.

8.1.2

Collect/Analyze Current Metrics – The contractor shall compile metrics into the Metrics Inventory to capture key information about the metrics, the date required for measurement, and ownership/responsibility.

8.1.3

Analyze Stakeholders – The contractor shall define the overall stakeholder universe through vertical and horizontal environmental scans.

DRD	Description	Frequency
DRD 8-1-1	Define / Review Strategic Objectives	As requested
DRD 8-1-2	Collect / Analyze Metrics	As requested
DRD 8-1-3	Analyze stakeholders	As requested

8.2 Performance Management - Design

In the design phase of the Performance Management Framework process, the emphasis is on generating new or refining existing metrics that meet good metric quality standards and are supported by impacted stakeholders. Meeting the customers' needs and expectations shall be the primary driver for performance management and the metrics should reflect this priority. The contractor shall apply Performance Management Framework processes and leverage existing government systems to design the performance logic model, identify metrics, validate metrics, and communicate performance expectations.

8.2.1

Develop/Review Performance Logic Model – The contractor shall identify three to four critical success factors for the work area, and three to four key performance indicators that indicate how well the objective / outcome has been achieved.

8.2.2

Identify Candidate Metrics - Using the Metrics Inventory, containing both legacy and new metrics, the contractor shall identify their alignment at the service level or the strategic level.

8.2.3

Compare With Other Metrics – The contractor shall compare the identified metrics with metrics captured through other means to reduce duplication, increase alignment, and encourage new ideas for evaluating performance.

8.2.4

Select, Test, and Validate Metrics – The contractor shall evaluate candidate metrics to ensure they are “good” metrics, as defined in the ITCD Metrics Inventory Template.

8.2.5 Receive Approval – The contractor shall submit metrics to the Performance Management Team to ensure that they are actively socializing the metrics inventory with primary stakeholders to explain the intent and address questions or concerns.

8.2.6

Communicate Performance Expectations – The contractor shall communicate performance expectations to those held accountable for meeting those expectations (customers) and those responsible for meeting the objectives (service delivery teams).

DRD	Description	Frequency
DRD 8-2	Design Performance Management capabilities for ITCD and its customers	As requested

8.3 Performance Management - Develop

In the develop phase of the performance management process, the focus is on the data and analytical capabilities necessary to efficiently and effectively manage performance. These steps are critical to ensure efficient and quality metric measurement and reporting with reduced risk. They also facilitate greater integration of performance data across work streams, to reduce information silos and enhance decision-making. The steps of the develop phase are:

8.3.1

Complete Data Dictionary – The contractor shall detail the data characteristics that support ITCD and/or customers sets of metrics.

8.3.2

Conduct Data Quality Review – The contractor shall identify whether the data is valid, complete, consistent, accurate, and verifiable.

8.3.3

Validate Analytics Capabilities – The contractor shall validate the analytics methodologies, IT systems and architectures, and analytics and visualization tools that enable insights to be derived from the identified performance data.

8.3.4

Integrate Performance and Budgeting Information – The contractor shall link strategic planning, budgeting, and performance management processes in a cyclical manner to support the senior leadership team in making data-driven decisions about what missions and goals should drive the organizations capabilities/services.

DRD	Description	Frequency
DRD 8-3	Develop Performance Management capabilities for ITCD and its customers.	As requested

8.4 Performance Management - Deploy

The Deploy phase of the performance management process emphasizes operationalization of the metrics, data, and analytics capabilities developed in the prior phases to establish and maintain the performance management capability.

8.4.1

Collect Data – The contractor shall collect the data identified in the Data Dictionary following the defined data governance procedures.

8.4.2

Conduct Measurements – The contractor shall use the metrics defined in the Metrics Inventory and the analytics technology defined in the Develop phase.

8.4.3

Create Integrated Reporting/Dashboard – The contractor shall create reporting / dashboards for communicating performance results to support decision-making, increased transparency, process improvement, and budget/operational planning.

8.4.4

Make Informed Decisions or Identify Improvements – The contractor shall use the results to inform future outcomes.

8.4.5

Capture Lessons Learned – The contractor shall conduct a lessons learned review at least annually to capture and share lessons learned from across the organization.

DRD	Description	Frequency
DRD 8-4	Deploy Performance Management capabilities, including metrics capture, reports, and dashboards	As requested

8.5 Metrics Management

The contractor shall assist NASA HQ with defining, managing, measuring, analyzing, and maintaining metrics for IT and programmatic services and support. The contractor shall implement and/or assist NASA HQ with implementing a technical solution for metrics capture, analysis, management, and maintenance. The contractor shall develop, manage, maintain, and execute a framework and methodology for metrics definition, management, analysis, reporting, and maintenance.

9.0 Risk Management

Proactive risk management strategy, risk management model, risk management framework, and risk management processes are some of the essential components to decision-making, IT strategy, and IT management. HQ ITCD seeks to proactively manage risk and to make fact-based decisions for services, investments, technology, standards, policies, etc. Through this proactive approach, HQ ITCD would like to address risk based on but not limited to: change, technology, current vs. future needs and requirements, budget, performance measures, and resource management.

The contractor shall provide support in the development and maintenance of the HQ ITCD Risk Management Model, strategy, framework, and related processes for improved and effective IT management and programmatic functions in HQ ITCD operations. The general risk management model, strategy, framework, and processes shall address activities such as performance risk, delivery risk, cost risk, support risk, impact risk, and operational risk. This programmatic approach to risk shall consider risk management and mitigation for services, support functions, technologies, products, processes, and standards established, provided, managed, executed, and maintained by HQ ITCD. To this extent, it is critical that each service, support function, technology, capability, product, process, and standard have a risk management plan and process to ensure synergy with the overall HQ ITCD risk management model, strategy, framework, and processes.

HQ ITCD requires that the contractor shall provide risk management expertise for effective risk strategies and mitigations. Therefore, it is critical that the contractor shall demonstrate competency in, perform, and provide support in (but not limited to):

- Risk identification
- Risk impact determination and assessment
- Risk projection
- Risk categorization
- Risk planning and mitigation
- Risk calculations and algorithms for risk assessment and decision making
- Risk management and planning
- Risk mitigation, monitoring, and management

Additionally, the contractor shall utilize tools and systems approved by HQ ITCD for storing and managing risks and related data.

DRD	Description	Frequency
DRD 9-1-1	Risk Management System	Due within 90 days after contract award
DRD 9-1-2	Risk Management Scorecard Template	Due within 90 days after contract award; Quarterly thereafter

DRD	Description	Frequency
DRD 9-1-3	Risk Management Scorecard Updates	Due within 60 days after contract award; Monthly thereafter
DRD 9-1-4	Risk Management Plan	Due first 60 days after contract award; Annually thereafter (upon request)
DRD 9-1-5a	Risk Management Governance Plan	Due first 90 days after contract award; Ongoing thereafter
DRD 9-1-5b	Risk Management Governance Plan Updates	Ongoing
DRD 9-1-5c	Risk Management Governance	Ongoing
DRD 9-1-6	Risk Management System Maintenance	Ongoing
DRD 9-1-7	Service Risk Management Plan and Scorecard (for each service)	Due first 90 days after contract award; Ongoing thereafter
DRD 9-1-8	Technology Risk Management Plan and Scorecard (for each technology)	Due first 90 days after contract award; Ongoing thereafter
DRD 9-1-9	Asset Risk Management Plan and Scorecard (for each asset—includes applications, IT systems, servers, etc.)	Due first 90 days after contract award; Ongoing thereafter
DRD 9-1-10	Technical Solution and Product Risk Management Plan and Scorecard (for each technical solution and product)	Due first 90 days after contract award; Ongoing thereafter
DRD 9-1-11	Data Center and Cloud Environment Risk Management Plan and Scorecard (for each)	Due first 90 days after contract award; Ongoing thereafter

DRD	Description	Frequency
DRD 9-1-12	Risk Management Improvement Plan and Recommendation	Monthly
DRD 9-1-13	<p>Execution of Risk Management (to include but limited to)</p> <ul style="list-style-type: none"> • risk identification • risk impact determination and assessment • risk projection • risk categorization • risk planning and mitigation • risk calculations and algorithms for risk assessment and decision making • risk management and planning • risk mitigation, monitoring, and management 	Ongoing

10.0 Knowledge Management (KM)

The aim of ITCD's KM is to support the strategic commitment for improving ITCD's effectiveness and communications as well as to improve its opportunity to enhance operations and continuously improve ITCD's performance through the improvement and sharing of organizational knowledge, data, and information (i.e. having the right knowledge, information, and data at the right time and place).

Thus, the major goals are to:

- Transform knowledge, data, and information to add value to the processes and operations of ITCD mission and leverage knowledge strategic to business in order to accelerate growth and innovation
- Use knowledge, data, and information to support ITCD stakeholders.
- Improve knowledge, data, and information assets
- Enhance the knowledge environment
- Manage knowledge as an asset
- Manage data and information as configuration items that integrate with ITCD knowledge and related process areas

The Contractor shall provide expertise, support, and services that assist HQ ITCD with achieving the aforementioned goals as well as future goals that will be defined by HQ ITCD.

The Contractor shall provide support and services related to the ITCD KM process such that the process provides ITCD with the ability to:

- Execute its core processes more efficiently and ensure proactive KM activities to support ITCD in creating, assimilating, disseminating, and applying its knowledge, data, and information in a continuous process in order to understand customer data and information needs
- Understand the location, applicability, validity, maturity, and usefulness of the knowledge, data, and information it processes and utilizes
- Understand how to improve the knowledge, data, and information. For each of the six aforementioned areas, core activities and core deliverables. These activities and deliverables shall be required for a formal ORR and successful closure of actions from ORR shall be required for completion of the Contract Transition
Identify the controls that should be implemented for proper maintenance and integrity of Knowledge Management processes, data, knowledge, and information
- Improve acquisition, evaluation, processing, organization, management, and maintenance of knowledge, information, and data within ITCD
- Define, implement, and manage metrics/measures for Knowledge Management for continuous improvement
- Define, implement, and manage metrics/measures for determining ITCD's knowledge management maturity

- Determine how ITCD's data, knowledge, and information is discovered, detected, acquired, assessed/vetted, and ingested
- Understand and assess the relationship between ITCD's organizational structure and the effect or impact that the organizational structure has on ITCD's ability to establish and implement Knowledge Management
- Determine an appropriate change management process for the organization
- Determine roles and responsibilities each staff member has in knowledge management
- Understand and assess the relationship that ITCD's core competencies (includes services) and that ITCD staff competencies have on knowledge management

10.1 Knowledge Management –Information and Data

The contractor shall provide Knowledge Management, related services, analysis, management, and support to HQ ITCD and its customers. The Contractor shall maintain the ITCD KM framework, model, CONOPS, and training plan. The contractor shall ensure execution of KM processes and shall develop and refine processes for continuous improvement of Knowledge Management. The contractor shall maintain, refine, enhance, and execute ITCD's Knowledge Management Plan. An Assessment of ITCD's execution of Knowledge Management shall be conducted by the contractor to determine gaps, risks, training required and process improvements.

The contractor shall maintain a scorecard from which NASA HQ ITCD can measure maturity and effectiveness of its Knowledge Management Framework and Model as well as to measure the quality of information and data.

- The Contractor shall assist in the documentation of knowledge, data, and information ITCD utilizes processes, manages, and disseminates.
- The Contractor shall identify what knowledge, data, and information ITCD does not have but needs to have based on ITIL service operations and risk management for service management.
- The Contractor shall assist in tracking and controlling how information and data are acquired, shared, retained, reuse, disposed of, and managed.

The contractor shall establish and/or refine metadata structure/taxonomy for ITCD's information and data. The contractor shall process ITCD information and data, categorize the information and data, support and manage the KM governance process to ensure proper review and approval of information and data for internal and external use. Once data and information is approved by the government, the contractor shall publish the information and data to the ITCD KM portal (for ITCD internal content) and to the appropriate systems for external content (HQ customers, Agency, federal, etc. recipients).

DRD	Description	Frequency
DRD 10-1-1	Knowledge Management Portal Updates	Daily
DRD 10-1-2	Knowledge Management Scorecard Template	Due first 60 days after contract award; Quarterly thereafter
DRD 10-1-3	Knowledge Management Scorecard Updates	Due first 60 days after contract award; Monthly thereafter
DRD 10-1-4	Knowledge Management Plan (for implementation)	Due first 60 days after contract award; Annually thereafter (upon request)
DRD 10-1-5	Knowledge Management Governance	Ongoing
DRD 10-1-6	Knowledge Management Content Management	Ongoing
DRD 10-1-7	Knowledge Managemnt CONOPS	30 days after contract award; updates quarterly thereafter

10.2 Knowledge Management –Knowledge Retention Services and Support

The contractor shall assist NASA HQ ITCD with the identification, capture, storage, and maintenance of knowledge in support of retaining NASA HQ ITCD staff experience and knowledge.

The contractor shall perform audits and assessment of core/critical NASA HQ ITCD processes, roles, and responsibilities (HQ and Agency level) to provide NASA HQ ITCD senior staff with potential risks to services, processes, and communication.

The contractor shall assist NASA HQ ITCD with maintaining knowledge retention plans and inventory of core processes, roles, and responsibilities to ensure continuity of support, service operations, and service management.

DRD	Description	Frequency
DRD 10-2-1	Knowledge Retention Plan	Upon Request
DRD 10-2-2	Knowledge Retention Assessment and Audit	Quarterly
DRD 10-2-3	Knowledge Retention and Risk Report	Quarterly
DRD 10-2-4	Inventory of Core Processes, ITCD POCs, Roles, and Responsibilities (Internal, HQ, and Agency) by Branch and Service Area	Quarterly
DRD 10-2-5	Knowledge Management Repository Maintenance	Ongoing

10.3 Knowledge Management –Transition Planning Services and Support

The contractor shall assist NASA HQ ITCD with the completion of transition plans and transition plan templates for transitioning roles, duties, responsibilities, functions, management, and oversight of services and processes between NASA HQ ITCD staff. The transition plans and templates shall be stored in a NASA HQ ITCD system for management and maintenance.

DRD	Description	Frequency
DRD 10-3-1	Transition Plan	Upon Request
DRD 10-3-2	Transition Plan Template Updates	Quarterly

10.4 Knowledge Management –Contractor Knowledge Management, Knowledge Retention, and Transition Planning

The contractor shall ensure that knowledge management, knowledge retention, and transition planning is performed for all services, support, functions, processes, procedures, roles, and responsibilities provided on this contract. The contractor shall implement a repository for storing knowledge management, knowledge retention, and transition plans for all contract staff. The contractor shall implement this

repository in the NASA HQ hosting facility and shall provide access to NASA HQ ITCD staff to ensure stability of knowledge as well as continuity of services and support for all service and requirement areas.

The contractor shall follow the same Knowledge Management model and methodology for contractor staff. The contractor shall maintain content and the repository according to knowledge management, knowledge retention, and transition planning requirements approved by NASA HQ ITCD for its staff.

The contractor shall provide the following deliverables pertaining to contractor staff.

DRD	Description	Frequency
DRD 10-4-1	Knowledge Management Portal Updates	Ongoing
DRD 10-4-2	Knowledge Management Scorecard Template	Due first 60 days after contract award; Quarterly thereafter
DRD 10-4-3	Knowledge Management Scorecard Updates	Due first 60 days after contract award; Monthly thereafter
DRD 10-4-4	Knowledge Management Plan and CONOPS	Due first 60 days after contract award; Annually thereafter (upon request)
DRD 10-4-5	Knowledge Management Governance	Ongoing
DRD 10-4-6	Knowledge Management Content Management	Daily, Ongoing
DRD 10-4-7	Knowledge Retention Plan	Daily
DRD 10-4-8	Knowledge Retention Assessment and Audit	Quarterly
DRD 10-4-9	Knowledge Retention and Risk Report	Quarterly
DRD 10-4-10	Inventory of Core Processes, HITSS POCs, Roles, and Responsibilities (Internal, HQ, and Agency)	Quarterly
DRD 10-4-11	Inventory of Processes, Data, Information, and Knowledge utilized/executed/ by HITSS	Quarterly

DRD	Description	Frequency
DRD 10-4-12	Knowledge Management Repository Maintenance	Ongoing

11.0 Customer Service

A goal of this contract is to ensure proactive management of all requests for service from HQ customers. This includes Help Desk Management, Service Desk Management, and Service Request Management.

The contractor shall provide and maintain on-site support staff that provides generalized and specialized IT information and support to HQ customers. The contractor shall keep abreast of current and emerging technologies that are relevant to the NASA IT environment and mission and serve as office environment experts. The on-site support shall accommodate customer via desk side support or notifications via phone or email from 7:30 AM to 5:00 PM, Monday through Friday excluding holidays. Services supported shall include:

- Initiating System Back ups
- File conversions
- Above core applications (e.g. Photoshop, Visio) support
- Use of Agency/Enterprise tools (such as ESD/Service Now)
- Assisting customers with identification of issue resolution path and contact points
- Other customer support requests by HQ Users

11.1 Customer Service - Service Coordination and Collaboration

Effective service coordination and collaboration with all internal and external customers and contractors is critical to the success of ITCD and the contractor for the delivery of HITSS services that have dependencies on other service providers. The contractor shall coordinate services and collaborate with the following internal and external entities: HQ end users, ITCD, NASA leadership, Enterprise Contractors, other HQ, and Agency personnel and contractors. The contractor shall support ITCD in the development of processes and procedures, OLAs, and other ITCD approved agreements that shall facilitate coordination and collaboration between contractors. The contractor shall be required to report on and escalate issues or status regarding coordination and collaboration to ITCD for guidance and resolution

11.2 Customer Service - Service Management

The contractor shall implement a service management program that provides comprehensive support in the planning for and management of customer requests. The contractor shall work closely with ITCD and become knowledgeable of individual Mission Directorates and Mission Support organization's mission, programs, and organizational structure, and work closely with their Points of Contact (POCs) and ITCD. The contractor shall support the Mission Directorates and Mission Support POCs in

collaboration with ITCD in defining and documenting IT business needs and requirements for their organization; developing, tracking and coordinating IT project schedules and activities.

Coordination and communication with customer advocacy groups is a critical success component for ITCD projects. The contractor shall support and facilitate meetings and activities associated with customer advocacy and coordination groups. This includes recurring meetings for the Customer Engagement Branch, Customer Advisory Committee, and other ad-hoc meetings and activities. The contractor shall:

- a. Propose, for Government approval, metrics that describe service delivery activities to measure contract performance with regard to adherence to Customer Requirements which include; service delivery, customer feedback, quality assurance and timely delivery of products and services;
- b. Anticipate issues, concerns, and problems and coordinate with ITCD to preemptively initiate resolution.

DRD	Description	Frequency
DRD 11-2-1	Customer Advisory and Service Review, meeting notes, action items, results, and schedule	As required within 2 business days of meetings

11.3 Customer Service - Incident Management

The HITSS contractor shall use the NASA Enterprise Service Desk (ESD)/Service Now for User Incidents reporting, management, and tracking. The contractor shall align with NASA's established Help Tier Support Structure (Tier 1, Tier 2, Tier 3 etc.) managing and delivering support for HITSS services and transfer of Incidents between other NASA IT service providers.

The contractor shall manage internal assignment and escalation of ESD incident tickets for services provided through the HITSS contract and where necessary coordinate services and actions with other service providers to resolve the incident or request.

The contractor shall use the NASA provided ESD system as the authoritative source to effectively manage and support all Incidents assigned to the HITSS contract. The contractor shall provide updates within the Incident ticket record documenting services performed and actions taken to resolve the incident.

The Contractor shall provide Incident Management support that includes but is not limited to the following:

- a) Leverage ESD processes and procedures to ensure close integration with ESD.
- b) Leverage dashboard and analysis services functions provisioned by the ESD for ticket analysis and reporting;

- c) Provide incident ticket analysis reporting that includes open and closed tickets, ticket aging, ticket escalations, and trend and service area analysis reports;
- d) Provide Tier 2 Incident support Monday through Friday during the prime time work hours of 6 a.m. to 6 p.m. Eastern U.S. time During non-prime time hours and when the government is closed, Tier 2 Incident support shall be provided remotely via phone and e-mail;
- e) Review all customer feedback received from the ESD customer satisfaction survey for HITSS provided services; ESD Survey Data will be provided by NASA;
- f) Review with NASA all surveys rated by customers that identify a rating of satisfactory or below;
- g) Provide and update Knowledge Articles used by ESD call agents to resolve and or route Incidents that pertain to HQ and HITSS specific contract services. Examples: Knowledge Articles for commonly identified incidents and or user self service activities with processes unique to HQ;
- h) Provide outreach and notifications to the ESD for planned and unplanned outages and, service configuration changes or activities affecting HQ customers as directed by ITCD.
- i) Provide ITCD technical monitors with status related to incidents, and resolution for ESD tickets that are assigned to the HITSS contract;
- j) Provide information to the ESD as to HQ specific configuration changes of importance for Tier levels support;
- k) Provide HITSS escalation procedures to the ESD;
- l) Provide a POC for ESD-to-HITSS-Contractor escalation processing for both normal business and after hours;
- m) Provide support for modifying incorrect data populated in ESD/ESRS Asset database to reflect HQ users actual Asset holdings.

DRD	Description	Frequency
DRD 11-.3-7	Customer Satisfaction Rating Report	Weekly
DRD 11-3-8	Summary and Trend Ticket Reporting including but not limited to number of tickets opened, completed and pending (e.g. under a week, under two or over three) number escalated, rating, closed, times to first respond, customer satisfaction	30 days from contract start and monthly thereafter

11.4 Customer Service - Service Request Management

The contractor shall provide services for the management and tracking of Service Request (SR) initiated at HQ to meet the business needs of HQ personnel. The contractor shall utilize the Government provided work request management system to track and manage all Service Requests associated with the services provided through the HITSS contract. The contractor shall adopt and align with ITCD business process and work flows associated with Service Request for both core and IDIQ work activities. The current HQ

work management system, Request Intake System (RIS), is a web-based service that allows ITCD and the HITSS contractor to create, track, and monitor the status of IT SRs. ITCD is presently developing additional tools and modifying workflow processes to support Service Management enhancements. The contractor shall work with the government to adopt and integrate such tools and maintain the required level of knowledge and competencies to utilize such tools. Until such tools have been made available the contractor shall utilize the existing RIS to:

- a. Maintain web-based SR initiation and browse capability;
- b. Maintain user permissions based on specific tasks;
- c. Maintain standard permissions for any customer who does not have a system USERID;
- d. Maintain ability to initiate a new service request, search for existing service requests, run standard and custom reports;
- e. Maintain ability to browse the SR review agenda;
- f. Maintain ability to browse the CCB Agenda; and
- g. Maintain automatic notification via e-mail for any change in status of the SR throughout the SR lifecycle.

For all SR's submitted and within scope of this PWS, the contractor shall:

- a. Ensure all SRs are entered into the work management and tracking system within 12 prime time hours of receipt and shall enter the agreed upon SR completion date within three business days of SR Government approval
- b. Coordinate the CCB SRRT (project initiation approval review) date or as directed by ITCD the full completion date of all service requests with the customer;
- c. Present and obtain approval for SR's that require Program Management Review Board (PMRB) control gate reviews for concurrence to proceed to the next milestone;
- d. Complete service requests by the approved completion date, customer concurrence is required prior to Service Request closure;
- e. Coordinate any extension of completion dates with the customer. The COR must approve requests for all extensions after two extensions have already been granted;
- f. Coordinate the closure of SRs with the customer. The contractor shall ensure that SRs are closed within 72 hours after completion;
- g. Coordinate extensions to approved completion dates or project milestones with the customer and/or the HQ CCB. The customer and/HQ CCB has the right to disagree with the date proposed by the contractor. This will be tracked as an unapproved completion date and counted against scheduled adherence metrics.
- h. Provide management and status reporting of each SR throughout its full life cycle

DRD	Description	Frequency
DRD 11-4-1	Service Request Processing Plan describing overall management and execution of the SR system	Within 2 weeks of contract start
DRD 11-4-2	Provide Report on Active and Closed SR's	Monthly
DRD 11-4-3	Provide by SR, The Actions performed and status of all SR's	Monthly

Metric #	Description	Metric
Metric 11-4-1	Milestone and schedule adherence	Completion of each milestone by the baseline due date 95% of the time
Metric 11-4-2	Enter all SRs into the work management and tracking system	Enter 95% of SRs into RIS within 12 prime time hours of receipt
Metric 11-4-3	Enter the agreed upon SR CCB review or completion date in RIS	Enter 95% of SRs into RIS within three business days of SR receipt
Metric 11-4-4	Contractor shall ensure that SRs are closed with customer concurrence	95% of all SRs are closed in RIS within 72 hours of completion

11.5 Customer Service – HQ RIS Service Request & QA Customer Surveys

To ensure that a level of quality on all service is monitored and managed a customer satisfaction survey will be conducted upon completion of each Service Request. The contractor shall provide the SR requestor with an ITCD approved customer survey, collect, analyze, and report the results to ITCD. The contractor may use the existing government provided survey capability or recommend an alternative for government approval.

- The contractor shall facilitate a customer satisfaction survey at the completion of each Service Request;
- The contractor shall collect, and analyze survey feedback and provide reports to the government associated with customer satisfaction;
- The contractor shall develop and recommend action plans as requested by ITCD to enhance customer satisfaction ratings.

DRD	Description	Frequency
DRD 11-5-1	Customer Survey Management plan	30 days after contract start
DRD 11-5-2	Provide plan to administer surveys for Government Approval (If existing survey mechanism is not used)	30 days after contract start
DRD 11-5-3	Provide proposed Survey to be utilized	At contract start date
DRD 11-5-4	Customer Satisfaction Summary and Trending Report	30 days after contract start, monthly thereafter

DRD 11-5-6	Provide Action Plan for SR's receiving low survey ratings	within 5 days of receipt of survey with low ratings 95% of the time
DRD 11-5-7	Provide status report of Action Plan activities initiated	Monthly

Metric #	Description	Metric
Metric 11-5-8	Facilitate or support completion of a Customer Survey to capture support level of Services Rendered on SR's	Within 72 hours of completion of SR

11.6 Customer Service - Event Support

The contractor shall serve as the IT expert for events requiring special IT support such as audio-visual services, event recording and transcription support at HQ. The contractor shall also provide support to other NASA contractors who are responsible for operating special IT equipment. IT support includes both on-site and off-site activities such as providing and configuring the necessary IT hardware and software, checking LAN connections, interfacing with other systems or facilities, providing dedicated support for the entire length of multi-day meetings. The contractor shall develop standard procedures for obtaining advance coordination for such IT support. Work products and procedures shall also adhere to standards of federal web publishing, IT security and Section 508 conformance along with all other applicable federal, Agency and departmental regulations. The Contractor shall document and provide reports as required for projects/events event support is provided.

- a. The contractor shall facilitate a customer survey appropriate to the work delivered
- b. Manage survey feedback and report to the government along with action plans to enhance customer satisfaction ratings as requested

Examples of such support are outlined below, but not limited to as follows:

- Recording and editing Interviews for Customer Web Sites (Offsite and Onsite)
- Recording, Editing, and Providing Captioning for NASA Meetings
- Special IT Program support (Take Your Child to Work Day, IT Services Day)

DRD	Description	Frequency
DRD 11-6-1	Provide Summary Event Activity Report including number of events, Title of Events supported, status of events (e.g. completed and pending), rating of support, date completed, Number of	Monthly

DRD	Description	Frequency
	Hours to complete, Customer name and organization	
DRD 11-6-2	Facilitate or support completion of a Customer Survey to capture support level of Services Rendered	within 72 hours of completion of Event Support
DRD 11-6-3	Provide Report on Survey Ratings for each Event	Within 5 days of Event Completion
DRD 11-6-4	Provide Action Plan for Events receiving low survey ratings	Monthly as
DRD 11-6-5	Provide status report of Action Plan activities initiated	On-Going

11.7 Software Release Authority Services and Support

The agency requires that each NASA Center complies with directives, regulations and processes for the release of software to the public (companies, institutions, etc.), other NASA Centers, and other federal agencies. The HQ ITCD Software Release Authority (SRA) role serves as the point of contact for review and approval of all HQ software/applications requested outside of NASA HQ. The contractor shall provide support services to HQ ITCD and the HQ Software Release Authority such as but not limited to the following:

- Daily review of the request queue to determine the appropriate process workflow that needs to be executed.
- Utilize the NASA system for processing requests.
- Enter data required for processing and approval.
- Communicate with Requestors regarding questions and/or information needed.
- Manage and maintain software release agreements with approval of the HQ ITCD Software Release Authority.
- Review processes and directives and provide recommendations on process improvements and/or application improvements for processing, tracking, managing, and maintaining software release requests, related artifacts and forms.
- Collect metrics on software release processes, requests, and other related activities.
- Work with software/application owners to update configuration management and release/provisioning processes with the SRA.
- Work with software/applications owners to release software/applications to other NASA Centers, the public, and/or other federal agencies upon SRA approval only and through the SRA governance processes.

DRD	Description	Frequency
DRD 11-7-1	Software Release Authority status report	Weekly

Metric #	Description	Metric
Metric 11-7-1	Software Release Requests	Software release requests shall be reviewed by the contractor within 1 business day of receipt.
Metric 11-7-2	Software Release Processing	Software release requests shall be processed by the contractor within 48 hours of confirmation that all information required for approval or rejection (by the HQ ITCD SRA) is received.

12.0 Customer Relationship Management

A goal of this contract is to provide IT services that enable HQ employees to conduct their business effectively and efficiently. A key component of delivering successful services is establishing and maintaining good customer relationships. To plan, establish, and manage these relationships, the contractor will align with and support the ITCD's Customer Relationship Management (CRM) Program. This program includes:

- a. Identification of key stakeholders and change agents,
- b. Frequent customer communication,
- c. Awareness of customer business process knowledge,
- d. Awareness of ITCD and Agency IT business processes
- e. Customer request tracking and coordination,
- f. Customer training,
- g. Identifying and developing customer solutions.

The contractor shall support the customer support function as an agent for ITCD. The contractor shall work with offices and customers to identify problems, opportunities, requirements, and risks. The contractor shall work with ITCD to identify solutions and mitigation strategies. They shall also focus on delivering effective IT solutions geared to meet customer's requirements.

DRD	Description	Frequency
DRD 12-0-1	Communications Plan	Due 30 days upon contract award; updates upon government request or as needed based on changes to core processes.
DRD 12-0-2	Customer Relationship Management Status Report and Metrics Report	Monthly
DRD 12-0-3	Deliver at contract start with the customer satisfaction survey, monthly summary analytics and trending	Customer Satisfaction Survey Report
DRD 12-0-4	Customer Relationship Management	Monthly
DRD 12-0-5	Recommendation, Risk, and Corrective Action Report	Monthly

Metric #	Description	Metric
Metric 12-0-1	Customer Satisfaction Surveys. Achieve a “4” or “5” (on a scale of 1-5 with 5 being the highest) on customer satisfaction surveys	95% meet the criteria

Service Level Agreement #	Description	SLA
SLA 12-0-1	Time to Response	The contractor shall acknowledge receipt of, document, and respond to customer inquiries, emails, calls, etc. within 2 hours of receipt

12.1 Customer Relationship Management - Service Model

The contractor shall adopt the ITCD CRM Service Model and maintain adherence to process that aligns with that Model.

The ITCD CRM Service Model is focused on understanding near and long term customer requirements, business needs and organizational mission. Support staff shall consistently monitor customer feedback and proactively engage with customers with a focus on developing opportunities to provide new capabilities and services to meet their business needs. This Service Model requires that the contractor:

- a. Be proactive and responsive to customer requests;

- b. In partnership with ITCD and stakeholders develop and maintain HQ Office and or Organizational specific profiles, and technology roadmaps that define business needs, near and long term projects, and timelines for service development and delivery of capabilities;
- c. As directed by ITCD ensure that customer requests are routed to the appropriate service provider correctly (regardless of the contract vehicle);
- d. Assist the requestor with or open the a Service Request in the appropriate system (RIS or ESRS) on the customer's behalf to obtain the services necessary to meet the request/requirement;
- e. Ensure that the request is communicated to and, if required escalate to the ITCD Customer Engagement Manager (CEM) for review, coordination, and or approval;
- f. If the HITSS contractor is responsible for completing the action, the contractor shall make contact with the customer to provide periodic updates and ensure that the action is completed to the customer's satisfaction;
- g. Be knowledgeable of the full suite of services provided through ITCD (HQ and Agency services) and process for subscribing to or obtaining these services or capabilities;
- h. Anticipates issues, concerns, and problems and proactively recommends resolutions and options;
- i. Facilitate customer awareness of the self help and self service capabilities of the ESD;
- j. Effectively develops and disseminates information regarding NASA IT services and technologies, new initiatives, existing services, capabilities, and operational status, etc.;
- k. Effectively coordinates with ITCD Customer Engagement Managers, IT Business Analyst, HQ Organizational IT Points of Contact, Task Managers, the Enterprise Service Desk, and other contractor Customer Service representatives to provide a uniform approach to customer service;
- l. Through the development of business partner type of relationship with HQ Offices and Mission Directorates understands the evolving IT requirements of the customer;
- m. Coordinates and obtains approval from ITCD to ensure recommendations and approaches can be supported within the IT service structure of HQ and the Agency;
- n. Coordinates with IT Security to ensure any recommended solution or changes meet IT security requirements, baselines, and policies;
- o. Propose, for Government approval, metrics that describe service delivery activities to measure contract performance with regard to service delivery, customer feedback, quality assurance and timely delivery of products and services;

DRD	Description	Frequency
DRD 12-1-1	Customer Service Model Metrics Proposal	Deliver 30 days after contract start
DRD 12-1-2	HQ Office and Mission Directorate Office and Organizational profiles	Deliver 30 days after contract start with continuous updates after initial delivery
DRD 12-1-3	HQ Office and Mission Directorate Office specific IT technology roadmaps	Deliver 60 days after contract start with continuous updates after initial delivery
DRD 12-1-4	CRM customer and stakeholder meeting notes, action items, results	As required within 2 business days of meetings
DRD 12-1-5	CRM Customer engagement satisfaction summary and Trending Report	30 days after contract start, monthly and as requested thereafter

Metric #	Description	Metric
Metric 12-1-1	Obtain Very Good or Excellent Satisfaction Rating for CRM engagement effectiveness	95% of service instances meet the criteria
Metric 12-1-2	Updates to the CRM HQ Office and Mission Directorate and Organizational profiles	Updates to the HQ Office and Mission Directorate and Organizational profiles completed within 2 business days 98% of the time
Metric 12-1-3	Updates to the CRM HQ Office and Mission Directorate Office specific IT technology roadmaps	Updates to the HQ Office and Mission Directorate Office specific IT technology roadmaps completed within 2 business days 98% of the time

13.0 Customer Training

The Contractor shall provide customer training, end-user documentation, and communication activities for IT applications, services, and projects that affect the HQ user community (NASA employees, contractors, and NASA HQ consultants). The contractor shall provide training using classes, video files, online content, printed materials and other methods as approved by the government. Classroom training shall be conducted in the on-site training facility (Computer Training Center), Monday through Friday, except Federal holidays, between 8:00 a.m. until 4:30 p.m. local time.

The contractor shall provide training for IT applications and services. Training methods shall include one-on-one, group, instructor led, remote, tutorial self-paced, virtually over the web, and on recorded media. Training shall be for for both legacy applications and newly development applications. In

addition, HQ users are increasingly impacted by NASA applications and services housed outside of HQ, and HQ is at times called upon to develop and/or deliver end-user documentation, outreach and computer training prior to deployment at HQ. The contractor shall recommend the appropriate training scope for each project for government approval and shall include approach, timing, dependencies, and audience. The contractor shall schedule and facilitate training sessions including facilities and equipment.

The contractor shall support NASA in planning for and implementing change associated with new IT capabilities within HQ and the Agency. NASA may call upon the contractor to provide support not only for HQ-specific system implementations, but also for Agency-wide initiatives that may impact HQ's infrastructure, processes or policies. Those activities include impact assessment of proposed change(s), modification and coordination of required changes, and documentation of change management processes and procedures.

Provide Internal and External Training Administration support to include tasks representative of:

- a. Partnering with ITCD to:
 - a. Marketing and advertising courses;
 - b. Monitoring and providing updates to ITCD regarding status of course registrations;
 - c. Providing final status of course registrations 2 weeks prior to the start of each class so that the ITCD can make a go/no go decision;
 - d. Printing and circulating the course roster to disseminate at the beginning of each class, working with the vendor to provide them with everything needed for access to the center (welcome letter, directions, badging information, etc.);
 - e. Working with the Training Facility and/or Conference Room Coordinators across the Center to schedule and handle course logistics (i.e., classroom and equipment set up; receipt and dissemination of course materials);
 - f. Properly opening and closing the class (i.e., introducing instructor-as needed, providing information on bathrooms, vending machines, emergency POC, ITCD Services, etc.);
 - g. Summarized course evaluation reports shall be submitted to the designated ITCD staff member within 3-5 days of completion of each course (or as requested);
 - h. Develop, manage, maintain, and execute the HQ IT Training Program to include deliverables and activities such as:
 - i. Program goals
 - ii. Program objectives
 - iii. Course curriculum, goals, objectives
 - iv. Course catalogs
 - v. Course calendars and schedules
 - vi. Computer and web based courses, instructor-led courses, workshops and seminars, video libraries/video lectures, reading rooms/libraries
- b. Include all metrics achieved for internal training processing to HQ Training Officer via monthly report;
- c. Participate in implementation and necessary user training for Internal Training Processing, and SATERN (NASA's Learning Management System);
- d. Document all training processes and procedures;
- e. Ensure that trainee and course training data is processed and submitted for Government approval through the SATERN database within 5 business days;

- f. Partner with ITCD to complete NSSC Request for Internal Training Form within 2 work days of receipt of request. Monitor progression of request (through the NSSC procurement process), and escalate issues impacting completion to the Training Officer or her/his designee. Notify Training Officer or his/her designee of completion of each request;
- g. Process and track all Academic Programs Course Registrations (i.e., Directorate and Center-funded); and submit to the Academic Programs Manager and/or the HQ Training Officer for required approvals;
- h. Follow up with course participants who have not completed NSSC end of course evaluation form within 3-5 days after receipt of non-completion report from NSSC;
- i. Include all metrics achieved for external training processing to HQ Training Officer via monthly report:
 - a. Within 3-5 days after the end of the month
- j. Provide Learning Management System (LMS) Administration training support to include tasks representative of;
- k. Serve as the Administrator for SATERN (Agency Learning Management System) for Headquarters, and attend Center and Agency meetings in that capacity;
- l. Serve as Center Representative on SATERN Operations Working Group;
- m. Create and/or maintain documentation on the database, including user manuals, data dictionaries, and other user training and tracking materials;
- n. Train and develop job aids for new user and update current users on a periodic basis on the latest system updates and features;
- o. Evaluate, document, maintain documentation, and make recommendations on the business processes in use in the training office which could affect data entry implementing any recommendations accepted by ITCD management as required;
- p. Make recommendations to Center Training Officer in regards to system enhancements/improvements;
- q. Create or run any standard or ad-hoc reports to evaluate data accuracy, track user compliance, analyze errors, respond to data calls, and troubleshoot system problems;
- r. Support internal Meetings and meetings with the Center Training Coordinators, and Administrative Officers to share information regarding system updates, enhancements, as well as identify customer's concerns/issues (as needed);
- s. Provide regular updates regarding system enhancements and/or training at ITCD Staff meetings, Administrative Officer's Quarterly meetings, and other forums as deemed appropriate;
- t. Execute SATERN Communication/Training Plan as needed;
- u. Communicate with the GSFC SATERN Administrator and vice versa for receipt, tracking status, and discharging responses to customer requests, and disseminating information pertaining to system policies, procedures, and processes;
- v. Provide support for the HRDB Web site Training Calendar, including:
 - Add new internal and external training classes to the calendar on a weekly basis
 - Make necessary edits and updates as requested by ITCD
 - Provide training demonstrations to HQ users
 - Provide job aids for training demonstrations
 - Ensure alignment with ITIL service improvement processes and functions as they pertain to training services
- w. Provide support for the ITCD Training Room Reservation system

The contractor shall have trainers certified and proficient in Shareable Content Reference Model (SCORM) and CMI5.

DRD	Description	Frequency
DRD 13-0-1	Training Program and Outreach Plan, detailing materials, methods and approaches	One month from contract start; updates bi-annually thereafter
DRD 13-0-2	Course Catalog	Monthly
DRD 13-0-3	Training Schedule (3-month forecast)	Quarterly
DRD 13-0-4	Monthly Training Report	Monthly
DRD 13-0-5	Training Course Registration status report	2 weeks prior to the start of each class
DRD 13-0-6	Training Course Evaluation Data	Within 3-5 days of completion of each course
DRD 13-0-7	Internal and External Training Monthly Report	Monthly
DRD 13-0-8	Training Calendar Updates	Weekly and as requested by ITCD

14.0 Communications Management

ITCD's IT communications program provides strategic, tactical, and proactive communication support for HQ CIO and all supported IT projects/programs. The contractor shall provide customer communication support, including development, maintenance, and execution of the ITCD Communications Plan.

Program support includes but not limited to:

- a. Content development and maintenance of ITCD-managed Web pages and user documentation;
- b. Identification of stakeholders/audience;
- c. Message delivery methodologies;
- d. Message timing;
- e. Message content;
- f. Technology to business terminology translation.

Additionally, the contractor shall provide timely submission for recurring outreach messages, including Inside HQ Web site, Heads Up articles, and others as defined. Specific outreach shall also be required to communicate “IT Notices” and associated distribution list for both local HQ and Agency Projects. The contractor shall be knowledgeable of NASA's prescribed standards and style requirements.

The contractor shall provide to the government an Outreach Activity Report providing data on outreach support provided.

DRD	Description	Frequency
DRD 14-0-1	<p>Outreach Activity Report providing:</p> <ul style="list-style-type: none"> • Number of Notices by Category of Notice • Web Sites Created • Number of Web sites updated • Number of Heads Up Articles Created • Data on Other Communications Efforts Supported 	30 days after contract and Monthly or as requested

15.0 Onboarding and Offboarding

It is NASA’s goal to equip all employees with the necessary assets to enable them to be productive on day one with NASA. This means that all IT assets such as computers, user accounts and system access is coordinated and delivered in advance of their start date. For off-boarding processes, it is important to inventory all IT assets issued to the departing employee and ensure proper disposition of the assets. This

means that all IT assets such as computers, user accounts, and system accesses are properly terminated after the employee's termination date.

The contractor shall provide support in the onboarding and off-boarding activities of NASA Headquarters employees (civil servant, contractor, temporary workers, remote users, etc.) excluding the Office of the Inspector General.

In support of these requirements, the contractor shall:

- a. Provide customer outreach and training related to onboarding and off-boarding Headquarters employees;
- b. Provide support to organizations and ITPOCs for onboarding and off-boarding processes, troubleshooting delays, and reporting;
- c. Provide support to HQ and Agency working groups for implementing process improvements and re-engineering as defined by the Agency Off-Boarding Initiative for NASA (OBIN);
- d. Provide input and support of on-boarding and off-boarding processes for all Headquarters employees (civil servant, contractor, temporary workers, remote users, etc.);
- e. Perform process reviews and make recommendations for re-engineering to ensure seamless transitions for arriving and departing staff;
- f. Participate in Headquarters and Agency level working groups, providing input for continuous improvement of onboarding and off-boarding processes;
- g. Provide regular reporting for onboarding and off-boarding staff activities;
- h. Provide support for NAMS on-boarding and off-boarding workflow configurations;

DRD	Description	Frequency
DRD 15-0-1	Semi-annual process review	Deliver six month after contract start, semi-annually thereafter
DRD 15-0-2	Off-boarding Statistics Report	Deliver weekly beginning one month from contract start
DRD 15-0-3	On-boarding Statistics Report	Deliver weekly beginning one month from contract start

Metric #	Description	Metric
Metric 15-0-1	Weekly report delivery for on-boarding and off-boarding statistics	98% delivered on first working day of each week

16.0 IT Security Management and Information Security Management

For any services, information systems, applications, and other information or IT resources provided by the contractor or managed by the contractor, the contractor shall incorporate IT security and information

security in all aspects of the work, in accordance with NASA and Federal information security requirements, to ensure appropriate protection of NASA data, applications and information systems. The contractor shall:

- a. Comply with all Federal and NASA policies and guidance, including NASA Policy Directives (NPD), NASA Procedural Requirements (NPR), NASA Interim Directives (NID), IT Security Handbooks, policy decision memoranda (PDM) and NASA standards, related to information security and IT security.
 - i. This includes implementing NASA Organizationally Defined Values (ODV), as documented in NASA IT Security Handbooks, which provide NASA-specific required parameters for security controls defined in National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53, *Security and Privacy Controls for Federal Information Systems and Organizations*.
 - ii. The contractor shall review and address any guidance from ITCD and other entities, such as the NASA Security Operations Center (SOC), in the form of Mitigation Action Recommendations (MAR), etc. This guidance generally provides information on current security vulnerabilities, which must be addressed in a timely manner in accordance with NASA policy.
- b. Collaborate and cooperate with other contractors providing IT and information security services and oversight on behalf of NASA, for example in support of the HQ Chief Information Security Office, the NASA SOC, or the NASA Office of the Chief Information Officer, to ensure that NASA IT security and information security requirements are met and compliance can be reviewed and verified.
- c. Allow NASA and its designees access to the contractor's and sub-contractor's facilities, installations, technical capabilities, operations, documentation, records, databases and personnel to the extent required to carry out a program of information security and IT security inspection and audit. This access is needed to safeguard against threats and hazards to the integrity, availability and confidentiality of NASA data.
- d. Develop, document and maintain an information security architecture that describes the overall philosophy, requirements, and approach to be taken with regard to protecting the confidentiality, integrity, and availability of NASA information and information systems in performance of this contract; and describes any information security assumptions about, and dependencies on, non-HITSS services.
- e. Perform all work on behalf of NASA, including any access to NASA information and IT systems, and processing, storage or transmission of NASA data, only from computers or mobile devices that have been authorized by NASA for this purpose (see section 16.1, Security Assessment and Authorization and Continuous Monitoring, of this PWS).
- f. Maintain a call list for all contractor and sub-contractor points of contact required for resolving IT security and information security problems. The contractor shall develop and implement escalation procedures for emergency or urgent responses for resolving IT security and information security problems.
- g. Develop, document and maintain, as needed, standard operating procedures for any contract-specific implementation of management, operational, and technical IT security controls or

processes for any services the contractor provides to NASA HQ. For each of these services, the contractor shall integrate the IT security procedures and control measures into their full life cycle.

- h. Maintain separation of sensitive IT duties within the contract service areas to limit risks due to insider threats.

DRD	Description	Frequency
DRD 16-0-1	Information Security Architecture	90 days after award
DRD 16-0-2	IT/Information Security Points of Contact list	30 days after award; updated as needed

Each of the following sections describes a specific area of emphasis, which the contractor shall address and implement.

16.1 Security Assessment & Authorization and Continuous Monitoring

For all NASA information systems managed by the contractor on behalf of NASA, the contractor shall perform all activities necessary to obtain and maintain a valid, current authorization to operate (ATO), in accordance with NASA policies and Federal guidance, such as the current versions of NIST SP 800-37, *Guide for Applying the Risk Management Framework to Federal Information Systems: A Security Life Cycle Approach*, and NIST SP 800-53, *Security and Privacy Controls for Federal Information Systems and Organizations*.

These activities shall include:

- a. Security categorization of the information system in accordance with Federal and NASA policy and guidance.
- b. Implementation and maintenance of approved security controls.
- c. Development and maintenance of a system security plan (SSP) and all required supporting documentation.
- d. Management and reporting of identified risks and any corrective actions, mitigations and risk acceptances in a Plan of Action and Milestones (POA&M).
- e. Continuous monitoring of security controls and their outputs, in accordance with Federal and NASA policies and guidance, to ensure that security controls continue to be effective and operate as intended, and to maintain continuous awareness of security risks associated with the information system and NASA data.

The contractor shall perform all activities and complete all documentation associated with security assessment and authorization (SA&A) using NASA's authoritative system for SA&A and continuous monitoring (currently known as the Risk Information Security Compliance System or RISCs).

For any contractor systems used to store, process, or access NASA data or NASA information systems, the contractor shall comply with Federal and NASA policy and guidance on external information systems (also known as contractor systems). This includes implementing security controls, completing the required security documentation, and providing any necessary access and information to NASA-designated security assessors in support of obtaining a NASA external system ATO or other necessary authorization to store, process or access NASA information or NASA information systems.

DRD	Description	Frequency
DRD 16-1-a	System Security Plan and associated documents, for any information systems managed by the contractor under this PWS	90 days after award; updated as needed
DRD 16-1-b	Plan of Action and Milestones, for any NASA information system managed by the contractor under this PWS	30 days after system authorization; updated as needed
Metric #	Description	Metric
Metric 16-1-1	POA&M items completed by the due date	90% of POA&M items are completed by the due date or re-baselined prior to the due date, measured monthly

16.2 Vulnerability Management

For all NASA information systems, computers and applications managed by the contractor on behalf of NASA, the contractor shall manage system, software, and application vulnerabilities or flaws to ensure that security risks are identified, understood, communicated and appropriately addressed in a timely manner, in accordance with Federal and NASA requirements, policies and guidance. This includes identifying vulnerabilities through network vulnerability scans (both credentialed and non-credentialed, as appropriate), conducting vulnerability assessments or reviewing vulnerability and threat information from other NASA or external sources, applying vendor patches or other security fixes, installing and operating anti-malware or other malicious code protection solutions, and taking any other necessary measures to identify and address security vulnerabilities.

The contractor shall be responsible for ensuring that all security vulnerabilities on information systems, computers and applications managed by the contractor are addressed within the timeframes required by NASA policy or directed by NASA personnel. NASA's authoritative vulnerability reporting solution(s) and dashboards will be used by NASA to verify compliance with these requirements.

The contractor shall utilize NASA authoritative tools for vulnerability identification and reporting, where available.

- a. The contractor shall install any NASA-mandated software asset management, hardware asset management, security configuration management or other vulnerability identification and reporting agents on all applications, devices and assets, and ensure that any required reporting from these tools occurs to the NASA vulnerability management or risk reporting solution.
- b. The contractor shall allow access by any NASA-mandated vulnerability scanning solution to contractor managed information systems, computers and applications to ensure that vulnerabilities can be identified and remediation can be verified.
- c. The necessary NASA tools and licensing for this functionality will be provided by NASA, as applicable.

Metric #	Description	Metric
Metric 16-2-1	Remediate, mitigate or request risk acceptance for all vulnerabilities on contractor-managed NASA information systems, in accordance with NASA vulnerability management requirements	98% of identified vulnerabilities are addressed within NASA vulnerability management requirements; measured by NASA authoritative reporting tools

16.3 Security Incident Management and Response

The contractor shall report all actual or suspected IT security or information security incidents involving NASA information, NASA information systems or other NASA IT assets to the NASA Security Operations Center immediately upon discovery. Security incidents involving suspected or actual breach of Personally Identifiable Information (PII) shall be reported within one hour of discovery.

The contractor shall support all NASA security incident management activities related to NASA information processed or handled by the contractor and any information systems, applications or other IT assets managed by the contractor in performance of this contract. This includes, but is not limited to:

- a. In the event of a security incident, complying immediately with all instructions from NASA-designated security incident management personnel for the purpose of minimizing the impact of a security incident, preventing damage, mitigating security issues, preserving forensic evidence, etc.
- b. Granting NASA-designated security incident management personnel immediate access to all devices, applications, information systems for the purpose of performing forensic imaging and/or analysis
- c. Supporting incident analysis activities related to information systems and applications managed by the contractor.

Metric #	Description	Metric
Metric 16-3-1	Report all security incidents involving suspected or actual breach of PII within 1 hour of discovery	100% of security incidents involving suspected or actual breach of PII are reported within 1 hour of discovery

16.4 Inventory/Asset Management

For all NASA information systems and information system components managed and/or operated by the contractor, the contractor shall ensure that all Hardware Asset Management (HWAM) information is monitored and reported using the authoritative NASA solutions for HWAM (currently IBM BigFix) and reporting (currently RISCs). The necessary software and licensing for this functionality will be provided by NASA.

16.5 Security Monitoring

For all NASA information systems, computers and applications managed by the contractor on behalf of NASA, the contractor shall continuously monitor these IT assets to detect attacks, indicators of potential attacks, unauthorized connections to or use of the IT assets, anomalous behavior, and other actual or potential security issues. Security monitoring and management of logs and other security monitoring data shall be in accordance with Federal and NASA requirements, policies and guidance.

The contractor shall use automated tools for security monitoring to the greatest extent feasible, in order to maximize monitoring effectiveness and efficiency and to support near real-time analysis of events.

Where available, the contractor shall use NASA authoritative security monitoring and reporting capabilities. The necessary NASA tools and licensing for such functionality shall be provided by NASA, as applicable.

Unless approved by NASA, the contractor shall not collect monitoring information or perform security monitoring that is duplicative of NASA security monitoring activities, such as those performed by the NASA Security Operations Center.

The contractor shall provide logs and other security monitoring information to NASA as requested, using the requested format(s) and mechanism(s).

DRD	Description	Frequency
DRD 16-5-1	Logs and other security monitoring data to be specified by NASA	Upon request

16.6 Security Configuration Management

For all NASA information systems and information system components managed and/or operated by the contractor, the contractor shall manage security configurations in accordance with the configuration management model as defined in section 22, Configuration Management, of this PWS. The contractor shall:

- a. Ensure that all IT assets managed and/or operated by the contractor are configured in accordance with the applicable NASA security configuration baselines, as specified by the NASA Agency Security Configuration Standards (ASCS) organization.
- b. Conduct testing of proposed security configuration settings to ensure that these settings meet all requirements, and that they do not unduly hinder NASA mission requirements.
- c. Document security configurations as implemented on all IT assets managed and/or operated by the contractor and update this documentation as configuration changes are made.
- d. Monitor and report compliance with the applicable NASA security configuration baselines using the authoritative NASA solutions for Configuration Settings Management (currently IBM BigFix) and reporting (currently RISCs). The necessary software and licensing for this functionality will be provided by NASA.
- e. Be responsible for continuously monitoring, and addressing any deviations from, the applicable NASA security configuration baselines. No security configuration deviations shall be implemented unless the contractor has obtained a NASA-approved waiver for the deviation. Waivers shall be documented in the NASA authoritative waiver system (currently RISCs) and shall be maintained and updated by the contractor as required.

16.7 Access and Account Management

For any information systems and applications managed by the contractor, the contractor shall ensure that account management and access management are performed in accordance with Federal and NASA requirements, in particular NASA policy and associated handbooks, SOPs and standards on Identity, Credential and Access Management (ICAM). For example:

- a. All systems and applications will be required to use the NASA Account Management System (NAMS) for account requests and approvals.
- b. Account provisioning and management shall be done using automated tools, unless otherwise approved by NASA.
- c. The contractor shall conduct bi-annual reviews of all accounts and access privileges and remove any account or access that is no longer needed in a timely manner.
- d. The contractor shall remove all IT access for HITSS 3 separated employees within one week of departure.
- e. The contractor shall ensure that account holders have the least privileges required to perform their necessary duties.

- f. The contractor shall maintain separation of sensitive IT duties to limit risks to NASA information and information systems.
- g. The contractor shall manage elevated privileges on all information systems, applications and IT assets in accordance with NASA policies and procedures.

DRD	Description	Frequency
DRD 16-7-1	Report of user accounts and privileges	Bi-annually, and as requested

Metric #	Description	Metric
Metric 16-7-1	All IT access for HITSS 3 separated employees is removed within one week of departure	98%, measured monthly

16.8 Contingency Planning, Training, Testing/Exercise, and Operations

For any information systems, applications, services, and facilities managed by the contractor on behalf of NASA, the contractor shall:

- a. Develop, document and maintain appropriate contingency plans.
- b. Train contractor personnel and NASA personnel, as needed, on those contingency plans, and periodically test and/or exercise those contingency plans, in accordance with Federal and NASA requirements, policy and guidance
- c. Conduct emergency operations during a contingency event in accordance with developed and approved contingency plans; and
- d. After a contingency event, ensure that operations of required information systems, services and facilities (including computers, networks, applications, data repositories, telecommunications, environmental, and technical support) can be resumed within required business timeframes.

DRD	Description	Frequency
DRD 16-8-1	Contingency plans for all NASA information systems managed by the contractor under this PWS	90 days after award; updated as needed

16.9 Information Security Management

The contractor and all contractor personnel shall be responsible for appropriately protecting NASA information, whether in electronic or any other form, in accordance with Federal and NASA policy and guidance. The contractor shall:

- a. Ensure that all US Government information provided, developed, or acquired under this contract is properly secured in accordance with Federal and NASA requirements including but not limited to NPR 1600.1, NPR 2810.1A, NASA ITS Handbooks, and other OCIO, NASA Office of Protective Services, and NASA HQ requirements;
- b. Adhere to applicable policy directives (e.g. NASA Procedural Requirements (NPR) 2810.1A Security of Information Technology; NPR 1600.1 NASA Security Program Procedural Requirements; NASA Policy Directive (NPD) 2540.1G, Personal Use of Government Office Equipment Including IT; NASA Federal Acquisition Regulations (FAR) Supplement 1852.204-76; National Institute of Standards and Technology (NIST) Special Publications (SP) – 800 Series and Federal Information Processing Standards (FIPS); NASA Information Technology Requirements (NITR); NASA ITS Handbooks; NASA Agency Chief Information Officer (CIO) requirements; HQ policies and procedures; and other governing security items);
- c. Appropriately label documents and media containing sensitive NASA information;
- d. Not store, copy, or transfer NASA Sensitive but Unclassified (SBU) information or Controlled Unclassified Information (CUI), or production data across non-production or development systems and networks, including off-site support systems and networks;
- e. Encrypt all electronic data transmissions of IT security or information security risks, threats, and/or vulnerabilities;
- f. Report any breaches or suspected breaches of sensitive NASA information (see section 16.3, Security Incident Management and Response, of this PWS).

For any collections of NASA information created or managed by the contractor on behalf of NASA, the contractor shall ensure compliance with all Federal regulations and NASA policies, including, but not limited to, those related to the Privacy Act of 1974, the Children's Online Privacy Protection Act of 1998, and the Paperwork Reduction Act of 1995. The contractor shall document each such collection in NASA's Privacy and CUI Assessment Tool (PCAT) and ensure that all PCAT-related requirements are completed for the collection.

16.10 Information Security Training

The contractor shall ensure that all contractor personnel meet all NASA and Federal requirements for IT security training and information security training. For example, this includes:

- a. Annual required NASA IT security awareness training regarding information security protection, privacy protection and IT security awareness

- b. Any NASA-required role-based security training required for all roles performed by contractor personnel
- c. For all employees with system elevated privileges, NASA-required elevated privileges training

For all required cybersecurity or information security training completed by contractor employees, the contractor shall ensure that training records are updated in SATERN, the System for Administration, Training, and Educational Resources for NASA.

DRD	Description	Frequency
DRD 16-10-1	Role-based security training records for contractor personnel	Annually

Metric #	Description	Metric
Metric 16-10-1	All contractor personnel meet cybersecurity/information security training requirements	98% of contractor personnel complete required annual IT security awareness training by the NASA deadline

17.0 Information Technology Infrastructure Library (ITIL) Support Services

In pursuing functional excellence and cost effectiveness, ITCD utilizes ITIL practices and framework for managing the design, development, delivery, and ongoing support of IT services. ITIL consists of five stages (Service Strategy, Service Design, Service Transition, Service Operation, and Continual Service Improvement) that formulates an IT service lifecycle. Within and between each of these stages, there are numerous processes and functions that interact and integrate. Therefore, execution and adoption of ITIL requires constant analysis and management of the interactions and integration of the people, processes, service providers, and technology to assess and deliver quality in services and products.

HQ ITCD has scoped the ITIL framework to how HQ ITCD can feasibly execute ITIL for HQ ITCD services. HQ ITCD has also developed an ITIL Handbook which contains tailored guidance for how ITCD executes a number of ITIL processes and the framework shall be executed overall. This handbook provides guidance on the processes that are feasible for ITCD to execute, deploy, manage, and maintain and how ITCD staff, service providers/contractors, shall perform the processes.

17.1 General ITIL Services and Support

The contractor shall assist in the management, maintenance, and execution of ITIL for services and support provided by NASA HQ ITCD according to NASA HQ ITCD's ITIL framework and handbook.

The contractor shall develop, create, maintain, and analyze data, services, lifecycles, processes, integration, and related activities to perform and to support the execution of ITIL. The contractor shall provide presentations and other related required documentation and artifacts in support of ITIL. The contractor shall maintain, update, enhance, and manage the ITCD ITIL framework, handbook, process documentation and related SOPs. The contractor shall provide a qualified staff to support HQ ITCD in its execution of ITIL.

DRD	Description	Frequency
DRD 17-1-1	Provide Data Required for ITIL	Ongoing
DRD 17-1-2	ITIL Framework Updates	Due 60 days after contract award; Quarterly thereafter
DRD 17-1-3	ITIL Handbook Updates	Due 60 days after contract award; Quarterly thereafter
DRD 17-1-4	Collection of ITIL Metrics	Daily
DRD 17-1-5	Maintenance of Systems Supporting ITSM	Ongoing
DRD 17-1-6	Review, Assessment, and Report of processes and functions executed	Monthly
DRD 17-1-7	Recommendations Report	Monthly
DRD 17-1-8	Service Catalog Updates and Maintenance	Ongoing
DRD 17-1-9	Service Portfolio Updates and Maintenance	Ongoing

17.2 ITIL Service Strategy, Design, and Standards

Requests for new services provided by HQ ITCD are initiated from several sources such as: (1) HQ customers/organizations/mission directorate needs and requirements, (2) HQ ITCD's research and assessment of gaps in current services (enterprise/agency and HQ services) and of near term technology needs and capabilities, (3) recommendations from service providers, and (4) agency requirements. The contractor shall contribute to the strategic and tactical planning required for establishment of new services. Therefore, it is essential that the contractor demonstrates strong experience in Service Strategy and Service Design to ensure that service models are feasible, stable, maintainable, and value added.

The contractor shall assist HQ ITCD and contribute to the strategies, policies, resource plans, risks (potential constraints, challenges, etc.), charters, pricing models, service models and offerings, related artifacts and processes, etc. for services. The contractor shall assist HQ ITCD and contribute to the designs, solutions, architectures, standards, and related artifacts and processes required for sound ITIL Service Design. The contractor shall assist and contribute to the collection, identification, development, documentation, analysis, and management of requirements for new services.

The following are some of the deliverables the contractor shall provide in the execution of ITIL Service Strategy:

DRD	Description	Frequency
DRD 17-2-1	Service Strategy Document (to be developed for each proposed new service)	Ongoing
DRD 17-2-2	Service Policy (to be developed for each proposed new service)	Ongoing
DRD 17-2-3	Service Resource Requirements Document (to be developed for each proposed new service)	Ongoing
DRD 17-2-4	Service Risks, Constraints and Mitigation Plan (to be developed for each proposed new service)	Ongoing
DRD 17-2-5	Service Charter (to be developed for each proposed new service)	Ongoing
DRD 17-2-6	ITIL Service Strategy Artifacts (to be developed for each proposed new service) (as outlined in the HQ ITCD ITIL Handbook)	Ongoing
DRD 17-2-7	Service Pricing Model (to be developed for each proposed new service)	Ongoing
DRD 17-2-8	Service Model (to be developed for each proposed new service)	Ongoing

The following are some of the deliverables the contractor shall provide in the execution of ITIL Service Design:

DRD	Description	Frequency
DRD 17-2-9	Service Solution Recommendation Document (to be developed for each proposed new service)	Ongoing
DRD 17-2-10	Service Design Document (to be developed for each proposed new service)	Ongoing
DRD 17-2-11	Service Specification Document (to be developed	Ongoing

DRD	Description	Frequency
	for each proposed new service) (Detailed level document)	
DRD 17-2-12	Service Architecture (to be developed for each proposed new service)	Ongoing
DRD 17-2-13	Service Standards (to be developed for each proposed new service)	Ongoing
DRD 17-2-14	ITIL Service Design Artifacts (to be developed for each proposed new service) (as outlined in the HQ ITCD ITIL Handbook)	Ongoing
DRD 17-2-15	Service Design Capability Test Plan (to be developed for each proposed new service)	Ongoing
DRD 17-2-16	Service Design Capability Test Results and Report (to be developed for each proposed new service)	Ongoing

The contractor shall assist with and conduct analysis, maintenance/updating, management, and validation of the standards baseline that applies to all services (proposed, new, and existing services). The contractor shall maintain the service standards baseline and shall utilize a system or tool provided by NASA HQ ITCD.

DRD	Description	Frequency
DRD 17-2-17	Service Standards Baseline	Ongoing
DRD 17-2-18	Service Standards Baseline System/Tool Updates and Maintenance	Ongoing

17.3 ITIL Service Transition Services and Support

To ensure stable and successful implementation of new services, effective transition of services into operation is essential. Additionally, as existing or current services are enhanced, changed, and/or retired, strong and effective transition processes are essential to ensure mitigation of impacts, risks, and operational functions. The contractor shall assist and provide support for the transition of new services into operational status, of changed services, enhanced services, and retired services. The contractor shall

implement new, changed, and enhanced services. The contractor shall also assist and provide support for the retirement of services.

The contractor shall develop transition plans, implementation plans, test plans, test results, test reports, and corrective actions in support and execution of transition of new, changed, enhanced, and retired services. The contractor shall utilize the ITIL Service Transition lifecycle, functions, processes, related artifacts based on the HQ ITCD ITIL framework, handbook, and the industry ITIL framework and best practices.

The following are some of the deliverables the contractor shall provide in the execution of ITIL Service Transition:

DRD	Description	Frequency
DRD 17-3-1	Service Transition Plan (to be developed for each proposed, new, changed, enhanced, and retired service)	Ongoing
DRD 17-3-2	Service Implementation Plan (to be developed for each proposed, new changed, enhanced, and retired service)	Ongoing
DRD 17-3-3	Service Transition Training Plan (to be developed for each proposed, new changed, enhanced, and retired service)	Ongoing
DRD 17-3-4	Service Transition Training (to be developed for each proposed, new changed, enhanced, and retired service)	Ongoing
DRD 17-3-5	Service Transition Communication Plan (to be developed for each proposed, new changed, enhanced, and retired service)	Ongoing
DRD 17-3-6	Service Retirement Plan (to be developed for each proposed retired service) (must address gaps resulting from the retirement of the service)	Ongoing

DRD	Description	Frequency
DRD 17-3-7	ITIL Service Transition Artifacts (to be developed for each proposed, new, changed, enhanced, and retired services) (as outlined in the HQ ITCD ITIL Handbook)	Ongoing

17.4 ITIL Service Operation and Continual Service Improvement Services and Support

The contractor shall provide services and support in service operations and continual service improvements utilizing the HQ ITCD ITIL framework, handbook, and the industry ITIL best practices and discipline. The contractor shall provide support in (but not limited to) the collection, analysis, and management service performance, quality, utilization, demand, capacity, and value of services in operation. The contractor shall review service targets (service level agreements, etc.) against actual performance and delivery metrics. The contractor shall make recommendations on and shall implement improvements for services as well as address corrective actions.

The following are some of the deliverables for Service Operation and Continual Service Improvement:

DRD	Description	Frequency
DRD 17-4-1	Service Achievement Report (includes items such as actuals on SLAs, etc.) (for each service)	Ongoing
DRD 17-4-2	Service Achievement vs. Service Target Report (for each service)	Ongoing
DRD 17-4-3	Continuous Service Improvement Inventory/Register (for each service)	Ongoing
DRD 17-4-4	Continuous Service Improvement Actions (for each service)	Ongoing
DRD 17-4-5	Continuous Service Improvement Plan (for each service)	Ongoing
DRD 17-4-6	ITIL Service Operations Artifacts (to be developed for each proposed, new,	Ongoing

DRD	Description	Frequency
	changed, enhanced, and retired services) (as outlined in the HQ ITCD ITIL Handbook)	
DRD 17-4-7	ITIL Continuous Service Improvement Artifacts (to be developed for each proposed, new, changed, enhanced, and retired services) (as outlined in the HQ ITCD ITIL Handbook)	Ongoing

17.5 Service Knowledge Management

HQ ITCD requires that a Service Knowledge Management System be developed, populated, maintained, and managed to establish a knowledge base of information on services. This system is distinct from the service portfolio, service inventory, service catalog, and other systems and artifacts required for service management. The purpose of the Service Knowledge Management System is a repository of information critical to the service providers, sponsors, HQ ITCD, and other support and integration teams for effective management and operation of services. The Service Knowledge Management System shall also store, protect, maintain, and share all the documents, information, and knowledge needed to design, transition and operate the service. Therefore, the contractor shall provide data and to update data in the system throughout (but not limited to) service strategy, service design, service transition, service operations, and the continuous improvement processes.

DRD	Description	Frequency
DRD 17-5-1	Service Knowledge Management	Ongoing
DRD 17-5-2	Service Knowledge Management System Updates and Maintenance	Ongoing

18.0 Service Catalog Maintenance and Support

The ITCD Service Catalog is comprised of an external, customer-facing Business Services Catalog and an internal, IT-facing Technical Services Catalog. The Service Catalog Management (SCM) process allows ITCD to establish, maintain, and update a customer-responsive catalog of IT service offerings, in addition to Service Level Objectives for customer-facing business services. The SCM framework ensures that ITCD's IT services align to NASA Headquarter's business objectives, and increases the overall quality and effectiveness of ITCD service provisioning.

18.1 Identify and Define Service Requirements

The contractor shall:

- Be proficient in service management software tools for all base IT Service Management functions.
- Aid in the identification of Service Requirements for any new or existing services to be placed in the IT Service Catalog.
- Leverage Service Definition documents to build out Service Catalog entries for new and existing services.
- Where appropriate develop applications in the service management software tool for routing requests for new and existing services.

DRD	Description	Frequency
DRD 18-1-1	Identify and provide a report on existing services for addition to the IT Service Catalog	45 Days after contract start
DRD 18-1-2	Identify and provide a report on new services for addition to the IT Service Catalog	Every 30 days, or as requested by the Service Catalog Manager

18.2 Update, Maintain IT Service Catalog

The contractor shall:

- Work with the Service Catalog Management (SCM) Process Owner and Service Catalog Administrator (SCA) to create, update, and maintain the IT Service Catalog.
- Facilitate approved changes to the IT Service Catalog in the NASA provided service management software tool.
- Ensure the accuracy of the information within the IT Service Catalog as well as its consistency with the information across the Service Portfolio.

DRD	Description	Frequency
DRD 18-2-1	Assess and recommend updates to Service Catalog entries for existing services	90 days after contract start
DRD 18-2-2	Build out Service Catalog entries for new services	Ongoing

18.3 Publish and Promote the IT Service Catalog

After the NASA HQ ITCD Investment Review Board (IRB) approves applicable services and service requirements, the contractor shall:

- Coordinate publishing requirements for the IT Service Catalog which will be viewable within the service management software tool as well as in the ITCD internal website.
- Coordinate updates to the IT Service Catalog.
- Develop and implement a communication plan for publicizing the IT Service Catalog to ITCD's customers.

19.0 Information Technology Management Services and Support Requirements

Management of Information Technology, the resources (people, technology, infrastructure, etc.), and services based on needs, demands, capacity, risk, requirements, policies, and priorities is essential for business and operations in IT. The contractor shall assist with, support, and/or perform the development, implementation, management, and maintenance of all processes, frameworks/methodologies, standards, governance, evaluation, and execution of Information Technology Management across all services, support, and requirements in the Performance Work Statement.

DRD	Description	Frequency
DRD 19-0-1	Information Technology Management Services and Support Plan	Due 90 Days of Contract Award
DRD 19-0-2	Information Technology Management Services and Support Plan Updates	Quarterly
DRD 19-0-3	Information Technology Services and Support Status Report	Monthly
DRD 19-0-4	Information Technology Services and Support	Ongoing

The Contractor shall assist with, support, and/or perform strategic planning of IT across all services (new, proposed, and existing) and support areas. The strategic planning activities shall be performed

within each of the following and will contribute to the overarching strategic planning of IT across NASA HQ ITCD, HQ, and the Agency such as:

- a. The ITCD Portfolio (program level)
- b. Services (service level)
- c. Technology
- d. Assets
- e. Processes
- f. Integration (program and service)
- g. Data and Information
- h. Operations

DRD	Description	Frequency
DRD 19-0-5	Information Technology Management Services and Support Strategy	Due 90 Days of Contract Award
DRD 19-0-6	Information Technology Management Services and Support Strategic Plan	Quarterly
DRD 19-0-7	Information Technology Management Services and Support Strategic Plan Status Report	Monthly
DRD 19-0-8	Information Technology Management Services and Support Strategic Planning, Implementation, and Execution	Ongoing

20.0 Governance Development and Maintenance Support Services

Governance is an essential component of Information Technology Management. Establishment of policies, continuous monitoring, implementation of controls, establishment of appropriate vetting mechanisms, change management, configuration management, risk management, service management and integration, communication mechanisms, portfolio management, and investment management are some of the key processes, activities, and tools that support and maintain governance.

The objectives of governance for ITCD are to:

- Establish boards and governance bodies for proper management of services, products, and technology.
- Manage delivery of services, products, and technology.
- Manage maintenance and enhancement of services, products, and technology.
- Management changes to services, products, and technology.
- Management mitigate impacts to services, products, technology, and support.
- Engage customers and organizational management to ensure proper prioritization and selection of technology, investment, and services.
- Communicate changes to services, technology, products, and support.
- Define, establish, manage, and analyze metrics to determine capacity, demand, efficiency, stability, and reliability of services, technology, products, and support.
- Collect data for effective decision making.
- Integration of service areas, service management, and service operations for effective solutions, services, and support.
- Oversight of service providers and management contracts.

The contractor shall assist in the management, maintenance, and execution of governance in NASA HQ ITCD according to NASA HQ ITCD's governance model and framework. The contractor shall submit data, presentations, packages, and other related required documentation and artifacts in support of governance. Essentially, the contractor is responsible and accountable for compliance with ITCD governance and shall provide the required documentation, data, and other related artifacts through the contractor's execution of and compliance with governance, standards, and processes.

The following are examples of governance components in NASA HQ ITCD for which the contractor shall support and assist in management, maintenance, and execution:

- Investment Review Board (IRB)
- Configuration Control Board (CCB)
- Architecture Board (ARB), Technical Reference Model (TRM), and Enterprise Architecture (EA) Model
- Functional and Service Area CCB (FSA CCB)
- Customer Advisory Board (CAB)
- Board of Directors (BOD)
- Project Management Office (PMO) and the Project Management Framework
- Project Management Reviews
- Portfolio Management Office & Team (PfMO) and Portfolio Management
- ITCD ITIL Framework, Handbook, and Related Guidance
- ITCD Systems Engineering & Implementation Framework

- ITCD Software Management Guide, Agile Framework, and other Software Development Guidance
- Technology Stack Definitions
- ITCD Data Center, Systems Engineering Facility, and ITCD Cloud Environment Standards, Policies, SLAs, and OLAs
- Audit and Compliance Office
- Program Integration Services
- ITCD Risk Management Framework and Processes

The contractor shall assist in the maintenance of governance charters, frameworks, plans, methodologies, and related artifacts. The contractor shall assist in the enforcement of governance in ITCD and in support services and supported provided under ITCD's management. The contractor shall provide the following deliverables for all governance boards, process meetings, committees, etc. supporting the management, enhancement, maintenance, execution, monitoring, and compliance with ITCD governance, agency governance, and federal governance.

DRD	Description	Frequency
DRD 20-0-1	Provide Data Required for Governance	Daily
DRD 20-0-2	Governance Plan Updates	Quarterly (based on governance assessments and metrics)
DRD 20-0-3	Governance Charter Updates	Upon Request
DRD 20-0-4	Collection of Governance Metrics	Daily
DRD 20-0-5	Governance Framework Updates	Quarterly (based on governance assessments and metrics)
DRD 20-0-6	Governance Process Updates	Quarterly (based on governance assessments and metrics)
DRD 20-0-7	Governance Board Decisions, Corrective Actions, and Minutes	Due with each governance board, component, process, etc. meeting
DRD 20-0-8	Packages, Presentations, and other related artifacts required for governance	Due with each governance board, component, process, etc. meeting

The contractor shall utilize NASA HQ ITCD systems for data capture, decisions, packages, documentation, and all other related governance artifacts. The contractor shall provide recommendations on enhancements to IT systems utilized for governance processes, data, metrics and measures, documentation, and related artifacts. In support of recommendations for IT system enhancements, the contractor shall contribute to determining data requirements and features required for improved management and execution of governance.

21.0 Change Management Services

Change Management is fundamental to effective IT management and governance. The contractor shall plan, coordinate, implement, manage, and monitor changes to services, infrastructure, processes, products, technology, applications and systems in operational status. (For the purposes of this contract, change management does not include the activities required to develop and test changes. Furthermore, while change management does require that implementation planning is performed and executed, the actual deployment of changes is addressed within the governance processes, data center operations SOPs, deployment plans, etc. within services such as but not limited to systems engineering, application development, etc.)

In support of these requirements, the contractor shall provide support and assist HQ ITCD with the following:

- a. Timely identification, planning, coordination, implementation, management, and monitoring of all changes.
- b. Secure, efficient, and prompt handling and processing of all changes.
- c. Ensure that changes are implemented with minimum disruption to services, infrastructure, processes, solutions, and consumer/customer productivity and business operations. Essentially, address obsolescence in services, systems/applications, products, technology, and infrastructure while sustaining Service Level Agreements (SLAs).
- d. Developing, implementing, maintaining, managing, and providing a consistent methodology by which changes are identified, planned, coordinate, implemented, managed, and monitored.
- e. Effectively ensuring quality of changes and the reduction of risk that could potentially be incurred by changes as well as any defects that might be introduced through implementation of changes.
- f. Establish levels of technical, managerial, financial, operational, and programmatic accountability to be maintained for each change.
- g. Establish a framework by which changes can be registered, tracked, justified, categorized, and related risk can be managed and/or mitigated.
- h. Documenting changes to provide sufficient information for sound decision making, effective communications, accurate views of current state versus future state for affected services, products, technology, infrastructure, systems/applications, etc. to be understood for determination and mitigation of impacts.

The contractor shall be responsible for ensuring the management of any implementation, alteration, and/or disposal of IT systems/applications, hardware, network, processes/procedures, solutions, technology, and products which enhances, adds to, modifies, and/or removes capabilities to/from the services, service delivery, and service operations.

The contractor shall utilize, manage, and maintain the change management system(s) provided by the government to store, track, manage, and disposition changes. The contractor shall also assess the change management system(s) to determine enhancements, modifications, and/or new technical solutions for change management.

The contractor shall utilize existing change management processes and shall develop, enhance, and maintain change management processes and procedures as needed to ensure mature change management across ITCD and the services, products, solutions, technology, systems/applications, infrastructure, etc.

DRD	Description	Frequency
DRD 21-0-1	Change Management System Updates	Ongoing
DRD 21-0-2	Assessment and Report of Change Management, Integration Requirements, Dependencies, and Risks	Monthly
DRD 21-0-3	Metrics Management and Measurement	Ongoing
DRD 21-0-4	Change Management Risk Report	Monthly
DRD 21-0-5	Change Management Risk Mitigation Recommendation	Monthly
DRD 21-0-6	Change Management Improvement Plan	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 21-0-7	Change Management Methodology and Framework	Due 90 days after contract award; quarterly thereafter unless government requests more frequent delivery
DRD 21-0-8	Change Management Processes and SOP(s)	Due 90 days after contract award; quarterly thereafter unless

DRD	Description	Frequency
		government requests more frequent delivery
DRD 21-0-9	Change Management Status Report	Weekly
DRD 21-0-10	Change Management Plan (for each service, product, application/system, infrastructure component, technology, and process as directed)	Ongoing for each change proposed for service, product, application/system, infrastructure component, technology, and process as directed
DRD 21-0-11	Change Management Communication Framework	Due 90 days upon contract award; quarterly thereafter (or more frequently as requested by the government)
DRD 21-0-12	Change Management Communication Plan (for each service, product, application/system, infrastructure component, technology, and process as directed)	Ongoing for each change proposed for service, product, application/system, infrastructure component, technology, and process as directed

21.1 The Change Management Framework, Methodology, Procedure, and Process

The contractor shall ensure that the change management framework, methodology, processes and procedures address items, activities, and data such as the following:

- Definition and types of risks
- Risk Categorization and Scoring
- Risk Mitigation
- Change Management Standards
- Metrics
- Types and Categories of Changes
- Change Status and Dispositioning of Status for Changes
- Acceptance and Rejection of Changes (Governance) and Related Criteria
- Corrective Actions

- Mitigation of Change Defects or Unsuccessful Changes
- Change Impact & Severity Levels and Related Criteria
- Business Assessment and Financial Requirement(s)
- Program Integration
- Project Management
- Project Integration
- Service Integration
- Sustainment Planning
- ITIL Processes (such as service operations, problem management, incident management, etc.)
- Verification and Validation
- Accountability, Roles, and Responsibilities
- Process Flows and Process Integration
- Knowledge Management
- Communications
- Schedules for Changes and Related Lead Times

The contractor shall have subject matter expertise in change management to ensure effective change management as well as the assessment, development and/or enhancement, execution, and management of change management across HQ ITCD services. The contractor shall ensure that change management activities, framework, methodology, processes, and procedures are vetted within the appropriate governance processes and entities as determined by the government.

To support and ensure integration of change management across services and IT activities, the contractor shall analyze service integration points, program integration points, dependencies, and metrics to identify potential corrective actions and risks that should be addressed in the change management framework, methodology, processes, and procedures and to make recommendations on mitigations and improvements.

DRD	Description	Frequency
DRD 21-1-1	Execution of the Change Management Methodology, Framework, Processes, and Procedures	Ongoing
DRD 21-1-2	Change Management Status and Metrics Review Meeting	Monthly

Metric #	Description	Metric
Metric 21-1-1	Accurate execution of the change management processes, and procedures	The contractor shall maintain 98% compliance with the Change Management Framework, methodology, processes, and procedures

Service Level Agreement #	Description	SLA
SLA 21-1-1	Accuracy of change management data and reporting	Change Management data and reporting will be 98% accurate
SLA 21-1-2	Change Management Metrics	<ul style="list-style-type: none"> • All changes shall be entered into the change management system and tools supporting change management • All changes recorded shall contain accurate information • All changes shall be successfully deployed with no adverse impacts or defects that will require cancellation, backing out, or reversal of changes • 99% of changes shall be deployed with less than 30 minutes of unplanned outage time

22.0 Configuration Management – Configuration Items, Information, and Data

HQ ITCD requires that accuracy, integrity, and maintenance of configuration items such as (but not limited to) artifacts, assets, products, etc. be executed, practiced, and managed in accordance with HQ ITCD, NASA, federal, and industry standards, policies, and frameworks/methodologies.

Configuration management will support effective IT Management as well as the core functions and disciplines required for effective IT Management such release management, change management, asset management, governance, and project management. Therefore, the contractor shall provide configuration management services and support to ensure effective management, control, performance/relevancy, and integrity of configuration items.

The contractor shall define a configuration management model and shall develop a configuration management framework, plan, SOPs, and related processes. The configuration management framework, configuration management plan, and related processes shall enhance the configuration management framework, plan, and related processes defined and established by HQ ITCD. The configuration management framework, configuration management plan, SOPs, and related processes shall address how the contractor will ensure the control of, changes to, management of, etc. of configuration items. Additionally, the contractor shall also define, establish, and maintain standards and policies for determining the appropriate state, status, and change activity for configuration items. Configuration management services, support, policies, products, framework/methodology, SOPs, and processes developed, supported, executed, managed, and maintained by the contractor shall be integrated with other IT Management components and processes such as change management, governance, release management, software development lifecycle (and software engineering), project management, systems engineering, Enterprise Architecture, ITIL, information security, and portfolio management. Configuration changes, updates, etc. to configuration items shall be approved by the government (HQ ITCD/NASA) before the contractor makes changes, updates, etc. to configuration items.

The Contractor shall develop and implement a technical solution for configuration management and that the technical solution be implemented and integrated by the contractor and be hosted within the NASA HQ ITCD hosting facility or cloud environment. The technical solution shall support the facilitation of, execution of, and enforcement of configuration management.

DRD	Description	Frequency
DRD 22-0-1	Technical Solution for Configuration Management	Due 60 days after contract award; ongoing thereafter
DRD 22-0-2	Configuration Management System (<i>also referred to as technical solution for</i>	Due 60 days after contract award; ongoing thereafter

DRD	Description	Frequency
	<i>configuration management</i>) Maintenance Plan	
DRD 22-0-3	Configuration Management Plan	Due first 60 days after contract award; Quarterly thereafter or more frequently per ITCD request
DRD 22-0-4a	Configuration Management Framework/Methodology	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 22-0-4b	Configuration Management Model	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 22-0-5	Configuration Management SOPs and Processes	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 22-0-6	Configuration Management Standards and Policies	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)

22.1 Configuration Management – Configuration Items, Information, and Data

The contractor shall identify configuration items, related information, and related data required to effectively provide configuration management services and support.

The contractor shall provide services and support such as (but not limited to) the following:

- a. Develop and establish standards (naming conventions) for how artifacts will be named.
- b. Develop and establish a taxonomy for how artifacts are stored and referenced.
- c. Identify all configuration items across all services on this contract as well as all configuration items with which the services and support for this contract are dependent.
 - i. Identify the configuration items, components, and related work products that will be placed under configuration management.
 - ii. Define and determine descriptions of each configuration item.

- iii. The dependencies shall be documented to ensure accurate and meaningful audits of configuration management, validity of dependencies, identification of risks, management of changes and risk, etc.
- d. Define standard for how versions of configuration items are determined, when and which versions can be used or made available.
- e. Define the appropriate state and status of configuration items.
- f. Define and determine relevant information and data required for effective management and integrity of configuration items.
- g. Define and determine relevant information and data required for retirement of configuration items and removal of configuration items from configuration management.
- h. Establish and/or refine metadata structure/taxonomy for configuration management information and data.
- i. Ensure accuracy of configuration item and configuration management information and data with regards to governance, standards, and other IT Management related processes.
- j. Conduct assessments of the configuration items, related information, and related data to determine validity of data and information associated and recorded for configuration items.
- k. Conduct audits of configuration items, related information, and related data to determine accuracy of data and information associated with configuration items as well as accuracy of the configuration items' state, version, status, etc. to ensure the integrity of the configuration baselines.

DRD	Description	Frequency
DRD 22-1-1	Naming Standards for Configuration Items	Due first 60 days after contract award; ongoing thereafter
DRD 22-1-2	Configuration Item (identification, inventory, and maintenance of information and data)	Due first 60 days after contract award; Ongoing thereafter
DRD 22-1-3	Configuration Item Audit and Report	Due first 60 days after contract award; Ongoing thereafter
DRD 22-1-4	Configuration Item Assessment and Report	Due first 60 days after contract award; Ongoing thereafter
DRD 22-1-5	Configuration Item Storage and Tracking Taxonomy	Due first 60 days after contract award; Ongoing thereafter
DRD 22-1-6	Configuration Item Versioning Standards, State,	Due first 60 days after contract award; Ongoing thereafter

DRD	Description	Frequency
	and Status Definition and Management	

Metric #	Description	Metric
Metric 22-1-1	Accurate execution of the configuration management processes, and procedures	The contractor shall maintain 100% compliance with the configuration management framework, methodology, processes, and procedures

Service Level Agreement #	Description	SLA
SLA 22-1-1	Accuracy of configuration management data, information, and reporting	Configuration Management data, information, and reporting shall be 99% accurate
SLA 22-1-2	Configuration Management Metrics	<ul style="list-style-type: none"> All changes shall be entered into the configuration management system and tools supporting configuration management. All changes recorded shall contain accurate information

The contractor shall develop the configuration management plan, framework, SOPs, model, processes, etc. in accordance to HQ ITCD configuration management requirements. Additionally, the contractor shall not promote configuration items to production, to baseline status, active status, etc. without HQ ITCD or NASA approval via the HQ ITCD and NASA governance entities/mechanisms.

23.0 Quality Assurance

Delivering quality services and products are an integral part of NASA HQ ITCD strategic objectives. As a result, NASA HQ ITCD has developed a formal Quality Management (QM) Program that includes QM activities to support a strategic focus on the enhancement of services and products provided to our stakeholders and customers. The program is devoted to:

- Delivering Reliable, Competent and Quality Services and Products fit for use
- Improving Customer Satisfaction
- Identifying and implementing Continual Service Improvement

The Contractor shall be responsible for developing Quality Management (QM) activities to be performed throughout the development, delivery and operations of products and services within this contract. The Contractor QM activities shall provide NASA HQ ITCD with visibility into the processes being used for the development and/or implementation of services and products. The Contractor shall adhere to NASA HQ ITCD QM program and incorporate industry best practices of quality management techniques to ensure that the strategic objectives of ITCD are met. The Contractor shall assure conformance to all requirements, methods, and standards established by NASA HQ ITCD. The contractor shall provide support and comply with NASA HQ ITCD quality standards, policies, procedures and activities. This includes but is not limited to the following:

- Provide data (such as customer service survey metrics, contact metrics, project status, internal verification and validation, test results, etc.)
- Respond to requested actions from the NASA ITCD Quality Management Team
- Review and address issues, and defects found during NASA HQ ITCD quality review process
- Attend NASA HQ ITCD quality management and project management related events, meetings and gate reviews as requested by the government
- Collaborate with NASA HQ ITCD quality assurance team to ensure work related workflows and SOP's meet and satisfy government requirements
- Perform internal reviews, testing, and validations approved by the government of established workflow process and Standard Operating Procedures (SOP's)
- Provide documentation as requested by the government to validate compliance to all QM requirements such as Reports and QA/QC Plan
- Adhere to requests necessary for planning independent verification and validation of products or services delivered
- Provide monthly quality status reports. At a minimum the report should include identified areas of improvement, customer satisfaction (obtained from survey data,

escalations, customer engagement, internal review findings, etc.), problems impacting customer satisfaction, lessons learned, corrective and preventative actions and process improvements.

- Prepare and deliver meeting and review minutes for all quality meetings and reviews in which the HQ ITCD requires the contractor's attendance. At a minimum the minutes shall contain the following information:
 - Date, time, and place
 - Attendees list
 - Purpose of meeting/review
 - Important items discussed
 - Results/Decisions made
 - Action items
- Assure the industry best practices are utilized and HQ ITCD standards are followed in delivering services or products per the quality objectives Provide reports and data of noncompliance and issues to NASA HQ ITCD Quality Management Team as requested by the government.
 - Provide a repository for QA and QC metrics and data. The repository shall have intelligence and taxonomy as well as must support business intelligence, ITIL service operations and continuous improvement processes, integration with other systems and applications implemented by or for HQ ITCD in support of IT Management and other standards and processes required for this contract.
 - Provide a root cause of faults and noncompliance report for products, services, attribute data, configuration items, and artifacts such as:
 - Unsatisfactory/Poor customer satisfaction
 - Documenting customer complaints, tracking the actions taken to resolve them and surveying customers on their satisfaction with the result
 - Incomplete or erroneous specifications
 - Incomplete or erroneous content, data, and information
 - Intentional deviation from specifications
 - Violation of standards and best practices
 - Error in data representation
 - Inconsistent interface component
 - Error in design logic
 - Inaccurate or incomplete documentation
 - Incomplete testing or test documentation
 - Miscellaneous

23.1 Quality Management Plan

The contractor shall develop, implement, manage, and maintain a Quality Management Plan (QMP) describing how quality shall be managed for the requirements outlined in this contract. When developing the QMP, the Contractor shall review and use as key input all available artifacts including any guidance provided by the NASA HQ ITCD. The Contractor shall adhere to generally accepted industry practices for quality management. At a minimum, the QMP shall capture the organizational structure, responsibilities, procedures, processes, and resources for implementing managing, and executing quality management. The QMP shall define how Quality Assurance (QA), Quality Control (QC), Independent Validation and Verification (IV&V), and Risk Assessment shall be conducted. The QMP shall also address management responsibility, contract review, design control, document and data control, product identification and traceability, process control, inspection and evaluation to be performed, corrective and preventive action, control of quality records, internal quality audits, training, and program and project management reviews.

The Contractor shall ensure the quality of Contractor provided products and services meets NASA HQ ITCD quality objectives and standards. The Contractor shall assure conformance of products to requirements, methods, and standards established by NASA HQ ITCD, including verification and validation of products, processes and services delivered under this contract. This includes quality assurance for all services and activities. The Contractor shall provide, implement, and maintain a quality assurance process that includes plans and procedures to ensure that products and services delivered conform to contract requirements, incorporate industry best practices, and are consistent with a project management and software management lifecycle approach.

QA and QC performed by the contractor shall include such activity as internal reviews, testing, and validations approved by the government of established workflow process and Standard Operating Procedures (SOP's). The contractor shall collaborate with the NASA HQ ITCD quality management team to ensure work related workflows and SOP's meet and satisfy government requirements.

To ensure project deliverables meet NASA HQ ITCD quality standards, the contractor shall:

- a. Establish and enhance quality assurance and quality control processes;
- b. Develop and deliver a Project Management Plan that includes the QA and QC plan for each project, regardless of project size or complexity including a pre and post deployment acceptance period;
- c. Ensure products, services and processes for acceptance by the government includes a project status report as part of the documentation from contractor that confirms all requirements and specifications have been met and the project is initiated, report should include test/pilot results, findings, corrective actions and risk mitigation strategies;

DRD	Description	Frequency
DRD 23-01-1	Quality Management Plan	Updates due quarterly after contract start
DRD 23-01-2	QA or QC Internal Review/Audit or Testing Documentation	As requested (On-going)
DRD 23-01-3	Quality Assurance System and Repository of QA Data	Due 30 days after contract award
DRD 23-01-4	Quality Control System and Repository of QC Data	Due 30 days after contract award
DRD 23-01-5	Root Cause of Faults and Non-Compliance Report	As requested (Ongoing)
DRD 23-01-6	Project Plan, QA and QC Plan	As requested (On-going)
DRD 23-01-7	Quality Status Reports	Due 15 th of each Month
DRD 23-01-8	Quality Meeting Minutes	Draft document due 2 business days after meeting. Final document due 1 business day after Draft is approved by the Government

Metric #	Description	Metric
Metric 23-1-1	Content of Quality Management Plan. Content of Initial Plan meets criteria provided by the Government in the ITCD Quality Assurance Plan	92% of objectives are achieved
Metric 23-1-2	Delivery of Updates to Quality Management Plan. Quarterly updates shall be submitted every 90 days, beginning 90 days after acceptance of the Initial Plan	92% submitted on time
Metric 23-1-3	Delivery of Requested Data. Response to inquiries must be delivered timely	92% submitted on time

Metric 23-1-4	Content of Requested Data. Provide accurate, complete and current data tailored to the requested requirements	90% of data accepted by the government without error
Metric 23-1-5	Assure continuous quality improvement in services and products as documented in quality status reports	At least 70% of government accepted documented process improvements are incorporated within 45 days of government acceptance
Metric 23-1-6	Assure customers are satisfied with the quality of customer service	No more than 15% of customers provide a rating of Satisfactory or Poor to overall customer service experience

24.0 Testing and Test Management Services and Support

The contractor shall perform and manage testing of all services, support, assets, deliverables/products/solutions/systems, infrastructure, architecture, design, etc. produced, recommended, developed, maintained, enhanced, implemented, etc. on this contract.

The goal of testing and test management on this contract is to:

1. Improve oversight of the coordination, management, and execution of activities and services supporting the accuracy, quality, reliability, accessibility, stability, performance, integrity, availability, verification, and validation of services, support, assets, deliverables/products/solutions/applications/websites/systems, infrastructure, architecture, design, etc. offered by HQ ITCD
2. Improve Quality Assurance, Quality Control, and Testing
3. Improve service integration, system and application integration, technology integration, change management, configuration management, impact analysis and mitigation, risk management, portfolio management, etc.

The contractor shall provide services and support required to achieve the aforementioned goals as well as future goals of testing and test management defined by HQ ITCD, NASA, and/or federal initiatives, standards, and regulations.

The contractor shall define a Test Strategy, Test Plan, Test Management Plan, SOPs, test cases, Test Report (describing the structure, required content, etc.) for each service and support area of the contract. The contractor shall establish a new repository (to be hosted in HQ ITCD data center) for storing,

managing, and maintaining the Test Plan, Test Management Plan, and test cases for each service and support area of the contract; or shall utilize a repository provided by HQ ITCD. HQ ITCD will determine whether the existing repository shall be utilized and maintained by the contractor, or if a new repository shall be developed, implemented, and maintained by the contractor.

The contractor shall define, develop, implement, execute, and manage a Test framework/methodology for activities such as but not limited to the following:

- A. Planning and Execution
- B. Verification and Validation of Requirements, Evaluation Criteria, Success Criteria, Metrics, Operational Level Agreements, and Service Level Agreements
- C. Installation, Structural, Configuration, and Infrastructure Testing
- D. Operations and Maintenance Testing

A. Planning and Execution:

- The contractor shall define and develop a communications plan for testing to ensure synergy, integration, and coordination with HQ ITCD, NASA, other federal agencies, and other service providers.
- The contractor shall track, manage, and provide oversight of actions required for surveillance, management, and execution of testing and test management services and support.
- The contractor shall define and develop metrics and analytics for ensuring continuous improvement of testing and test management as well as risk management.
- The contractor shall perform Impact-of-Change analysis and shall develop and submit an estimate of work and cost to address impacts.

B. Verification and Validation of Requirements, Evaluation Criteria, Success Criteria, Metrics, Operational Level Agreements, and Service Level Agreements:

- The contractor shall review business cases, user stories, use cases, requirements, etc.
- The contractor shall perform criticality analysis on the business cases, user stories, use cases, requirements, etc.
- The contractor shall determine the integrity level of requirements.
- The contractor shall perform requirement traceability analysis.
- The contractor shall evaluate service, product, system, infrastructure, and application/software/web service/website requirements.
- The contractor shall analyze interfaces to applications, websites, systems, etc. to ensure that requirements are verified and validated against NASA HQ ITCD approved architecture, infrastructure, service, and application/web service/website/system designs.
- The contractor shall test for compliance with NASA, HQ ITCD, federal, and industry standards.

- The contractor shall provide reporting and related data to HQ ITCD, other service providers, and the HQ ITCD IV&V team.
- The contractor shall test against evaluation and success criteria approved by NASA HQ ITCD that is (1) defined by NASA HQ ITCD and (2) defined by the contractor.

C. Installation, Configuration, Structural, and Infrastructure Testing

- The contractor shall test installations and configurations such as but not limited to applications, systems, etc.
- The contractor shall test service transitions and implementations.
- The contractor shall perform analysis of reporting of defects resulting from installations; track defects; and ensure traceability of defects related to installations.
- The contractor shall provide reporting related to testing.
- The contractor shall test for disaster recovery and fail over.
- The contractor shall test for structural for compliance with NASA, HQ ITCD, federal, and industry standards.
- The contractor shall test items such as but not limited to applications, systems, websites, webservices, system and application integrations, integrations and dependencies with other service providers and services such as but not limited to end user services (EUSO), desktop services (ACES), help desk (ESD), web services (WEST and CSSO), and networks (NICS).
- The contractor shall perform load and boundary testing.

D. Operation and Maintenance Testing

- The contractor shall perform Impact-of-Change analysis.
- The contractor shall test system performance, availability, reliability, and utilization.
- The contractor shall test for information assurance (IA).
- The contractor shall test service capability, demand, performance, and test for compliance to metrics.
- The contractor shall test for compliance with standards, policies, regulations, service level agreements, and operational level agreements across services, systems, applications, products, websites, hosting environments (such as the cloud environment and the NASA HQ Computing Center/Data Center), etc.
- The contractor shall test for operational risks.
- The contractor shall perform maintenance testing and shall develop and execute test plans from an operational perspective to ensure the validity and effectiveness of plans required for this contract in support and execution of services, applications, infrastructure, systems, etc. Examples of plans the contractor shall test cyclically are:
 - a. Sustainment Plan
 - b. Configuration Management Plan
 - c. Change Management Plan
 - d. Communications Plan

- e. Test Management Plan
- f. Quality Assurance Plan
- g. Quality Control Plan
- h. Risk Management Plan
- i. Security Plan
- j. Continuity of Operations Plan (COOP)
- k. Disaster Recovery Plan
- l. Data Management Plan
- m. Information Management Plan
- n. IT Management Plan
- o. IT Service Management Plan
- The contractor shall provide test results and a test report, assist HQ ITCD with identifying gaps and deficiencies, make recommendations for improvements, and shall implement changes, enhancements, and improvements upon HQ ITCD approval.

The contractor shall assist HQ ITCD with defining metrics to monitor success and effectiveness of testing, test management, and corrective actions across all services on the contract.

HQ ITCD requires that a technical solution for testing and test management of services, products, solutions, technology, etc. (excluding applications, software, products, web services, websites developed under section 26) across this contract be implemented by the contractor and that the technical solution be hosted within the NASA HQ ITCD hosting facility or cloud environment. The technical solution shall support the facilitation of, execution of, and enforcement of testing and test management across services on the contract. The contractor shall develop, implement, test, and maintain a technical solution for testing and test management of services, products, solutions, capabilities, technology, etc.

DRD	Description	Frequency
DRD 24-0-1	Technical Solution for Testing and Test Management (across and at the contract level)	Due 60 days after contract award
DRD 24-0-2	Test Management Plan (for the contract)	Due 60 days after contract award; quarterly thereafter
DRD 24-0-3	Test Cases, Scripts (if applicable), Scenarios (for the contract)	Due first 60 days after contract award; Quarterly thereafter or more frequently per ITCD request
DRD 24-0-4	Test Strategy and Test Plan (at the contract level)	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 24-0-5	Test Framework and Methodology (at the contract level)	Due first 60 days after contract award; Quarterly thereafter (or

DRD	Description	Frequency
		more frequently upon ITCD request)
DRD 24-0-6	Test SOPs and Processes	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 24-0-7	Test and Test Management Standards and Policies	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)

Service Level Agreement #	Description	SLA
SLA 24-0-1	Testing of Service Capacity and Demand	<ul style="list-style-type: none"> • Testing of service capacity shall be performed quarterly based on HQ ITCD's selection of services to be evaluated • Evaluation results shall be provided within 5 business days of initiation of service evaluation
SLA 24-0-2	O&M Testing (as specified by HQ ITCD)	<ul style="list-style-type: none"> • O&M testing shall be ongoing. The contractor shall performed O&M testing between the 1st and the 6th of the month • The contractor shall provide test results and recommended corrective actions and risks to HQ ITCD within 5 business days after conclusion of O&M testing
SLA 24-0-3	Installation, Configuration, Structural, and Infrastructure Testing (as specified by HQ ITCD)	<ul style="list-style-type: none"> • Testing shall be ongoing. The contractor shall performed O&M testing between the 1st and the 6th of the month • The contractor shall provide test results and recommended corrective actions and risks to

Service Level Agreement #	Description	SLA
		HQ ITCD within 3 business days after conclusion of testing
SLA 24-0-4	Verification and Validation of Requirements, Evaluation Criteria, Success Criteria, Metrics, Operational Level Agreements, and Service Level Agreements (as specified by HQ ITCD)	<ul style="list-style-type: none"> Testing and related activities shall be ongoing. The contractor shall perform related testing quarterly based on HQ ITCD approval of selected OLAs, SLAs, evaluation criteria, success criteria, verification and validation requirements, and metrics. The contractor shall conduct this testing between the 7th and 15th of the month The contractor shall provide test results, recommended corrective actions, and risks to HQ ITCD within 5 business days after conclusion of testing

25A.0 Enterprise Architecture Services and Support

Enterprise Architecture (EA) is a method and an organizing principle that aligns functional business objectives and strategies with an IT strategy and execution plan. The Enterprise Architecture provides a guide to direct the evolution and transformation of enterprises with considerations to business, information, applications and supporting technology.

EA support, at a high level, includes current state modeling; enterprise analysis, current state documentation, target state definition and documentation, gap analysis, and transition plan creation and execution.

25A.1 Contractor Experience

The contractor shall have demonstrated experience and extensive knowledge and understanding of each of the following:

- The Office of Management and Budget (OMB) Federal Enterprise Architecture Framework (FEAF); including scope, direction, and governance practices.

- General Accountability Office (GAO) EA Maturity Management Framework (EAMMF) model, how it is scored and how to advance against the scorecard
- Department of Defense Architecture Framework (DoDAF), The Open Group Architecture Framework (TOGAF), Zachman and FEAF framework models in advancing agency strategic goals.
- EA Best-practice experience from other Federal agencies.
- Working knowledge of Industry EA Best Practices.
- Expert knowledge of EA documentation artifacts and related EA Framework requirements
- The ability to establish the needed working relationships with program and project managers and other stakeholders to understand their role in evolving the EA.

25A.2 General EA Tasks

- The contractor shall develop a methodology for implementing an Enterprise Architecture program for NASA HQ ITCD.
- The contractor shall provide EA development consulting support services to NASA HQ ITCD to assist in establishing, documenting, maintaining, and maturing an EA Program that complies with industry best practice, Federal EA guidance and NASA Agency EA policies and procedures.
- Shall leverage, where possible, both industry and government EA templates to document and develop segment architectures for selected enterprise segments. The results of the segment architecture documentation and development effort shall be leveraged for the development of the Enterprise Architecture Transition Plan.
- The contractor shall draft, coordinate, maintain and support initial versions of segment architectures for core NASA HQ ITCD business and enterprise services.
- The contractor shall develop a current state (As-Is) Enterprise Architecture model consisting of the segments identified within sections 7.1, 7.2, 7.3 and 7.4.
- The contractor shall develop a future state (To-Be) Enterprise Architecture consisting of the segments identified within sections 7.1, 7.2, 7.3 and 7.4.
- The contractor shall perform a gap analysis that will serve to identify the shortfalls of the current state in terms of its ability to support NASA HQ ITCD objectives, strategic and tactical plans, and initiatives.
- The contractor shall develop an Architecture Roadmap and EA transition plan that defines the initiatives required to migrate from the current state to the future state.
- The contractor shall identify, document, recommend, implement and operationally support EA related tools for governance, reporting and modeling.
- The contractor shall prepare and conduct EA Reviews for existing and newly proposed projects and services working with the appropriate NASA HQ ITCD line of business or service managers on all required EA elements.
- The contractor shall support the continuous maturity of the NASA HQ ITCD EA Program through EA process and governance definition and documentation.
- The contractor shall identify, document, and support performance goals and metrics for Business Architecture, Information Architecture, Application Architecture, and IT Infrastructure and Technology Architecture from the business strategy through the implementation and

maintenance of the EA Program, as well as the “critical points” and sequence activities of the Enterprise Architecture Transition Plan (TP).

- Assist with the establishment of and operationally support the NASA HQ ITCD Enterprise Architecture Review Board (EARB)
- The contractor shall conduct periodic assessments of the NASA HQ ITCD enterprise portfolio from multiple perspectives to identify, document, and support analytic reporting recommendations on architectural alignment, investment composition, segment architectures, changes to the target architecture, and Transition Plan execution monitoring. The analytics processes shall be designed and executed to ensure consistent, coordinated IT decision-making. It shall focus on ensuring innovation, the efficient use of IT, reduction of unnecessary duplication, avoidance of cost, optimized information sharing, and interoperability.

25A.3 Enterprise Architecture Segment Definition

The contractor shall take a lead role in developing the following EA architecture segments:

25A.3.1 Business Architecture

The contractor shall:

- Perform analysis of core NASA HQ ITCD lines of business, activities and work streams.
- Provide consulting support services to ensure that IT investments effectively support business requirements, are linked to NASA HQ ITCD Strategic Plans and Initiatives, and provide maximum business value to NASA HQ Customers.
- Work with NASA HQ ITCD and other organizations to complete business and IT architecture planning.
- Ensure that the business architecture complies with the guidelines established in the Federal Enterprise Architecture.
- Assess and document the alignment of the Business Architecture to the NASA HQ ITCD Application Architecture, Information Architecture and IT Infrastructure & Technology Architecture.
- Provide support for Business Process Reengineering (BPR) efforts within NASA HQ ITCD.
- Assess business drivers and provide any resulting IT capability gap findings.
- Develop for NASA HQ ITCD review and approval, IT vision and business/IT alignment statements.
- Establish and document the alignment of business, functional, and IT goals and objectives.

25A.3.2 Information Architecture

The contractor shall:

- Provide consulting support services for the planning and implementation of a robust data management program that supports Enterprise Architecture definition and conforms to the Federal Enterprise Architecture Program's Data Reference Model (DRM).
- Assist in defining, prioritizing, scheduling and executing steps to establish a framework for Data Management Program(s) including: conducting requirements gathering; assessing the As-Is data architecture and management situation; performing gap analysis; developing a To-Be data architecture and data management program; developing a transition plan; and supporting other data management initiatives.
- Ensure that the information architecture complies with the guidelines established in the Federal Enterprise Architecture.
- Assess and document the alignment of the Information Architecture to the NASA HQ ITCD Business Architecture, Application Architecture and IT Infrastructure & Technology Architecture.
- Support the development and maintenance of comprehensive Data Management Programs that include key components such as data architecture; data dictionary; data models; data and metadata repositories; data stewardship; data quality; data acquisition; data usage; and data retention.
- Work with NASA HQ ITCD and other organizations for data architecture planning and implementation initiatives.

25A.3.3 Application Architecture

The contractor shall:

- Define, develop, maintain, and enhance application architecture in accordance to Agency enterprise architecture, APM (application portfolio management), and the Agency Applications Office (AAO) program standards and processes.
- Conduct application architecture initiatives, such as, identifying and classifying applications and application components, where applicable, according to the specific business and performance objectives they support and the technologies they employ.
- Document and perform analyses of the current application inventory and provide detailed application architecture guidelines to improve both business and technology processes and applications in the interest of integration and cost containment. These analyses may include perspectives such as Gartner Magic Quadrant, interoperability capability, performance and scalability, reliability and availability, application lifecycle stage, and technological risks.
- Provide support to identify and recommend which applications should be delivered, what technologies should be used to deliver them, and how the applications should be designed, deployed and integrated in the most effective and flexible way.
- Support requirements gathering and high-level design for IT application development as they relate to the EA application architecture.
- Assess and document the alignment of applications/services to the NASA HQ ITCD Business Architecture, Information Architecture and IT Infrastructure & Technology Architecture.
- Ensure that the application architecture complies with the guidelines established in the Federal Enterprise Architecture.

- Work with NASA HQ ITCD and other organizations to support application architecture planning, implementation, and maintenance as they relate to the EA application architecture.
- Provide application business architecture support in assessing the continued performance of applications in producing business value and return on investment.

25A.3.4 IT Infrastructure & Technology Architecture

- Conduct IT infrastructure and technology architecture initiatives, such as, identifying and classifying NASA HQ ITCD IT infrastructure and technology, according to the specific strategic plan initiatives, lines of business, information, applications and division performance objectives they support.
- Ensure that the IT infrastructure and technology architecture complies with the guidelines established in the Federal Enterprise Architecture.
- Assess and document the alignment of IT infrastructure and technology to the NASA HQ ITCD Business Architecture, Information Architecture and application Architecture.

DRD #	Description	Frequency
DRD 25A-1	EA Development Methodology	30 days from contract award and as requested to account for updates
DRD 25-A-2	As-Is NASA HQ ITCD Enterprise Architecture	90 days from contract award
DRD 25-A-3	To-Be NASA HQ ITCD Enterprise Architecture	120 days from contract award
DRD 25-A-4	NASA HQ ITCD Enterprise Architecture Transition Plan	150 days from contract award
DRD 25-A-5	NASA HQ ITCD Enterprise Architecture Review Board Charter and Associated Processes	30 days from contract award
DRD 25-A-6	NASA HQ ITCD Emerging Technology Strategy and Implementation Plan	30 days from contract award
DRD 25-A-7	Requirements, Business Architecture and System Architecture for NASA HQ ITCD Emerging Technology Virtual Test Bed Environment	60 days from contract award

The following Key Performance Indicators are defined for the services and support required for section 25A and its subsections. The Contractor shall meet these KPIs.

KPI #	Key Performance Indicator	Standard	Metric	Method of Surveillance
	Develop the NASA HQ ITCD EA development Methodology	30 days from contract award and as requested to account for updates	1. Delivered on time; 2. Acceptance of the EA development methodology by NASA HQ ITCD Leadership	Review of all related deliverables
	Implement the NASA HQ ITCD EA development Methodology	Starts no later than 60 days from contract award	1. Starts on time; 2. Successful completion and delivery of all agreed upon schedule based tasks and deliverables	Review of project implementation schedule and all required deliverables
KPI 25A-1	Develop the As-Is NASA HQ ITCD EA	90 days from contract award	1. Delivered on time; 2. Accepted by the government	Periodic Inspection throughout
KPI 25A-2	Develop the To-Be NASA HQ ITCD EA	120 days from contract award	1. Delivered on time; 2. Accepted by the government	Periodic Inspection throughout
KPI 25A-3	Develop the NASA HQ ITCD EA Transition Plan	150 days from contract award	1. Delivered on time; 2. Accepted by the government	Periodic Inspection
KPI 25A-4	Implement NASA HQ ITCD EA Transition Plan	Starts no later than 180 days from contract award	1. Starts on time; 2. Successful completion and delivery of all agreed upon schedule based tasks and deliverables	Review of project implementation schedule and all required deliverables
KPI 25A-5	Develop the NASA HQ ITCD Enterprise Architecture Review Board	30 days from contract award	1. Delivered on time; 2. Accepted by the government	Periodic Inspection

KPI #	Key Performance Indicator	Standard	Metric	Method of Surveillance
	charter and associated processes			
KPI 25A-6	Implement the NASA HQ ITCD Enterprise Architecture Review Board	Starts no later than 120 days from contract award	1. Starts on time; 2. Functions ongoing	Periodic Inspection of charter and processes
KPI 25A-7	Develop the NASA HQ ITCD Emerging Technology strategy and implementation plan	30 days from contract award	1. Delivered on time; 2. Accepted by the government	Periodic Inspection
KPI 25A-8	Implement the NASA HQ ITCD Emerging Technology strategy and implementation plan	Starts no later than 90 days from contract award	1. Starts on time; 2. Functions ongoing	Periodic Inspection
KPI 25A-9	Develop the requirements, business architecture and system architecture for NASA HQ ITCD Emerging Technology virtual test bed environment	60 days from contract award	1. Delivered on time; 2. Accepted by the government	Periodic Inspection
KPI 25A-10	Implement the requirements, business architecture and system architecture for NASA HQ ITCD Emerging Technology	Starts no later than 90 days from contract award	1. Starts on time; 2. Functions ongoing	Periodic Inspection

KPI #	Key Performance Indicator	Standard	Metric	Method of Surveillance
	virtual test bed environment			

25B.0 Business Intelligence and Big Data Services and Support

Business Intelligence and Data Analytics:

In order to continue to meet the needs of its customer base in the face of budget shortfalls, NASA HQ ITCD is in need of an efficient and effective business intelligence (BI) and data analytics (DA) capability. NASA HQ ITCD needs to have real time and on demand access to both its critical current and historical data. This access must be granted in a manner that supports perspective based analysis and situational awareness through the use of dashboards, ad-hoc reporting, real time operational monitoring of both operational and financial data and predictive analysis. NASA HQ ITCD leadership and ITCD subject matter experts must be able to understand the past, monitor the present and use this knowledge as a means to predict future outcomes. This requires the creation and implementation of a Business Intelligence and Data Analytics framework that can serve to aid in identifying and ultimately addressing the needs of NASA HQ ITCD, its mission partners and other NASA stakeholders.

25B.1 Define a Business Intelligence (BI) and Data Analytics (DA) Strategy:

The contractor shall define and deliver to NASA HQ ITCD a strategy for sustained BI and DA development pursuant to the current and future set of NASA HQ ITCD business capabilities and the data that is a produced by them.

This strategy shall account for all NASA HQ ITCD service domains and shall, at a minimum, address the following:

- BI & DA opportunities for measuring and improving NASA HQ ITCD key services and processes;
- Prioritization of opportunities based on factors such as Return On Investment (RO), feasibility and risk;
- Guidance, coordination and integration of BI & DA initiatives facilitating cross—service domain analysis and reuse of data and functionality;
- Metrics for measuring the success of BI & DA applications in improving NASA HQ ITCD's service performance;
- Identification of data elements, both available and desired but not currently available;

- Identification of key enablers to establishing BI & DA as an on going business capability; (i.e. personnel and financial resources, training and governance)
- Required actions to establish BI & DA as an on going business service;
- Approaches for identifying and managing risk pertaining to BI & DA;

25B.2 Define a Supporting Technical Architecture:

The contractor shall define a technical architecture to support the BI & DA strategy.

The architecture shall provide a framework for organizing and classifying NASA HQ ITCD data, definition of information management processes and identification of the technology components needed to build the BI & DA system.

The following are required of the supporting architecture:

- The data components of the architecture should include both internal and external sources of structured and unstructured;
- The information management components of the architecture should include the definition of strategies, processes and standard operating procedures for data source integration, data cleansing and data transformation. These strategies, processes and standard operation procedures should be defined in a manner that they consider both data classification and retention constraints according to NASA and Federal policy and guidelines.
- The architecture should also identify and describe in detail the conceptual and logical technology components required to realize the defined BI and DA strategy.

25B.3 Implementation of BI & DA strategy and Technical Architecture:

The contractor shall implement the BI & DA strategy and technical architecture.

The contractor, working with NASA HQ ITCD subject matter experts, shall perform an analysis of alternatives (AOA) to identify a number of potential implementation level solutions that meet the requirements of the BI & DA strategy and technical architecture. As a result of the AOA findings, the contractor shall recommend a solution for implementation. The recommendation shall include a detailed description of the tools to be used within NASA HQ ITCD for BI & DA as well as the needed supporting IT infrastructure – i.e., hardware, database software and networking devices. Upon NASA HQ ITCD approval, the contractor shall implement the recommend solution for BI & DA making it operationally available for use within the NASA HQ ITCD environment.

DRD	Description	Frequency
DRD 25B-3-1	Business Intelligence Strategy	Due 60 days after contract award; updates upon request.
DRD 25B-3-2	Data Analytics Strategy	Due 60 days after contract award; updates upon request.

DRD	Description	Frequency
DRD 25B-3-3	Placeholder for a future DRD which may be added via a contract modification	See Description Comments.
DRD 25B-3-4	Business Intelligence Model and Framework/Methodology	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 25B-3-5	Data Analytics Framework	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 25B-3-6	Business Intelligence and Data Analytics Metrics	Ongoing
DRD 25B-3-7	Risk Management Plan Business Intelligence and Data Analytics	Ongoing
DRD 25B-3-8	Business Intelligence Tactical Plan and Initiatives	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 25B-3-9	Data Analytics Tactical Plan and Initiatives	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 25B-3-10	Information Management, Business Intelligence, and Data Analytics Integration Plan	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 25B-3-11	Information Management, Business Intelligence, and Data Analytics Report	Monthly

26.0 Application & Website Development, Web Services, and Business Architecture Requirements

Application & Website Development provides comprehensive information services, delivering software, mobile applications, and responsive web applications and defining business architecture to meet customer's business needs. In addition to developing complex search, reporting, query and knowledge management tools ITCD requires that the contractor develop solutions (apps, web service, websites, systems, business architecture, etc.) that align with and support enterprise and agency objectives. Much of the current

HQ application inventory consists of legacy stove-piped applications that were replicated multiple times. Our challenge is to migrate or consolidate as many of these instances as practical to a modern information framework that shall extend reuse of data sources, information organization, and application functions while provisioning a faster more efficient environment to create and field applications.

This new environment shall be guided by design goals of provisioning modern customer-facing interfaces, automated data exchanges from validated sources, and of reducing our dependence on specific hardware, and increasing our ability to employ analytics across our application inventory. Our objective is to provide decision support and knowledge services to the leadership of NASA and to support similar needs across the Agency.

The contractor shall migrate applications, websites, web services, IT systems, etc. to HQ ITCD hosting environments, other NASA hosting environments, agency/enterprise application development teams (through agency/enterprise services), and to other NASA Center service teams if technologically, fiscally, managerially, suitable, and feasible based on Agency strategic sourcing initiatives and HQ ITCD request, authorization, approval and governance model.

Service Level Agreement	Description	SLA
SLA 26-0-1	Personnel management and training <ul style="list-style-type: none"> • Turnover of staff by skill level/position • Staff availability by skill level/position • Elapsed time to get staff by skill level/position • Ongoing training hours per FTE by technology/methodology 	<ul style="list-style-type: none"> • Turnover <20% • 100% availability • Onboard skilled developers within one month • Minimum of 5 days of agile and development based training for developers per year.
SLA 26-0-2	Functional Quality – Do applications meet functional requirements? <ul style="list-style-type: none"> • Response times by transaction • Number of defects by severity level 	<ul style="list-style-type: none"> • All response time requirements are met 99.95% of the time. • For enhancements, 0% increase in defects • Code delivered with 0 severity level 1 defects

Service Level Agreement	Description	SLA
SLA 26-0-3	Technical Quality and standard adherence – Does the delivered application meet all required specifications? <ul style="list-style-type: none"> • Cyclomatic complexity (CC) • Dead code • Unstructured code • Compliance with Coding Standards 	<ul style="list-style-type: none"> • CC < 10 per module • 0% dead code • <5% unstructured code • 100% compliance, ensured through inspections
SLA 26-0-4	Process Quality – How well do development processes perform? <ul style="list-style-type: none"> • Defect removal rate • Defect density 	<ul style="list-style-type: none"> • Defect removal rates of > 95% • Defect densities of < 3 per module
SLA 26-0-5	Customer Satisfaction <ul style="list-style-type: none"> • Do applications and services have high quality as defined within SLA 26-0-2, SLA 26-0-3 and SLA 26-0-4? • Does app dev. provide solutions in a timely manner 	<ul style="list-style-type: none"> • Scale-based opinion survey via Work Request Intake System (WRIS) • Scale-based opinion survey via WRIS

Metric #	Description	Metric
Metric 26-0-1	Post-Release Bug Fixes	All application version releases shall be error free and not require post-release bug fixes. The contractor shall meet this metric with 98% of releases

26.1 Application, Software, Web Application, and IT System Development and Configuration

Application, web application, IT system (defined as integrated applications providing a technical solution or capability), and software development and configuration is a major component of IT services

due to the transactions, business rules, data management, and process automation handled and managed by applications, web applications, software, and IT systems. The contractor shall develop, configure, enhance, maintain, manage, analyze, and implement applications, web applications, software, and IT systems.

26.1.1 Application, Software, Web Application, and IT System Development

The contractor shall provide Application, Software, Web Application, and IT System development support and services. The contractor shall ensure compliance with NASA Software Development Lifecycle processes, standards and operating procedures. The contractor shall develop applications, software, web applications, and IT systems which successfully satisfy user requirements.

26.1.2 Mobile Application Development

Mobile Application Development pertains to the design, development, installation, and maintenance of scalable, high performance mobile applications. The contractor shall have experience in mobile development strategy and building both native and cross platform mobile apps of differing size and scope. The contractor shall comply with all NASA Application Development policies, standards and operating procedures in addition to using industry best practices in order to deliver value to end users. Mobile Application Development expertise is required for both iOS and Android.

26.1.3 COTS configuration and custom development

COTS configuration and custom development pertain to the installation and management of commercial off the shelf software applications and or components. The contractor shall provide personnel with expertise in installing, configuring and troubleshooting COTS software applications and components. The contractor shall provide personnel with experience developing web services which allow for the integration of COTS software with custom developed software.

26.2 Website Development

The contractor shall provide website development services. Website development shall be performed in accordance with HQ ITCD standards, NASA website standards, content management requirements outlined in this Performance Work Statement (PWS), other NASA NPRs, NPDS, and other federal and industry guidelines.

The contractor shall utilize baseline, approved, and targeted technologies approved and defined by NASA and HQ ITCD for development of websites, for support and services provided in relation to website maintenance and management.

26.3 Web services

The contractor shall be proficient in the analysis, design, development, implementation, and maintenance of web services for system integration, data management, business intelligence, and a variety of other IT management and technical solutions.

26.4 Business architecture

The contractor shall ensure that all newly developed and existing applications are in compliance with the NASA HQ ITCD business architecture. The contractor shall ensure that all newly developed and existing applications are documented appropriately as to convey traceability to the ITCD business architecture.

The contractor shall ensure that all newly developed and existing applications, web-applications, mobile applications and websites are classified and categorized appropriately according to the NASA Business Reference Model (BRM), NASA Engineering Architecture (EA), and the NASA HQ ITCD BRM.

26.5 Application Portfolio & Application Portfolio Management

An effective practice of IT Management is technical management to include the management of applications, web services, websites, software, and IT systems. HQ ITCD requires portfolio management of applications, web services, websites, software, and IT systems. The contractor shall provide support and services in the management of portfolio(s) for applications, websites, web services, software, and IT systems.

26.5.1 Application Portfolio & Portfolio Management

The contractor shall develop, implement, and/or manage and maintain a portfolio of applications, web services, IT systems, and web applications. The contractor shall define an application management strategy, methodology, framework, SOPs, and processes for maintaining accuracy of portfolio data, for maintenance of the portfolio, and management of the portfolio.

HQ ITCD requires a validation of the application, web service, web application, software, and IT system portfolio data to ensure a credible baseline of inventory and related portfolio data for HQ, ITCD, and customers. Attributes collected for the portfolio are to be approved and defined by NASA. The contractor shall review and determine gaps in attributes captured and shall make recommendations for enhanced portfolio management. The contractor shall perform audits of the portfolio(s) to determine corrective actions, issues, and potential risks. The contractor shall also provide a risk management plan for timely assessment and mitigation of technical debt, roadmaps, etc.

As part of the portfolio management support and services provided by the contractor, HQ ITCD requires that application rationalization and modernization be strategized, planned, executed, and implemented.

26.5.2 Legacy Application Management

HQ ITCD requires that legacy application management be performed in order to address technical risk, technical debt, and technical obsolescence. The contractor shall develop, manage/maintain, and execute a legacy application disposition plan for applications, web services, web applications, software, and IT systems. The contractor shall analyze the portfolio, the TRM, emerging technology, history of defects, security risks, etc. to determine application roadmaps and to develop the legacy application disposition plan. The contractor shall maintain the plan on an ongoing basis with consideration to application modernization, rationalization, and consolidation as well.

DRD	Description	Frequency
DRD 26-5-1-1	Application Portfolio Management System (for Applications, Web Applications, Software, Web Services, and IT Systems)	Implementation and/or enhancement due 60 days after contract award
DRD 26-5-1-2	Application Portfolio Management System Maintenance Report	Monthly
DRD 26-5-1-3a	Application Portfolio Management Strategy and Methodology (for Applications, Web Applications, Software, Web Services, and IT Systems)	Draft due first 30 days after contract award
DRD 26-5-1-3b	Application Portfolio Management Strategy and Methodology (for Applications, Web Applications, Software, Web Services, and IT Systems)	Final due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-5-1-3c	Application Portfolio Management Framework, SOPs, and Processes (for Applications, Web Applications, Software, Web Services, and IT Systems)	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-5-1-4	Application Portfolio Management Standards (for Applications, Web Applications, Software, Web Services, and IT Systems)	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently

DRD	Description	Frequency
DRD 26-5-1-5	Application Portfolio Audits and Reporting (for Applications, Web Applications, Software, Web Services, and IT Systems data)	Due first 60 days after contract award; Quarterly thereafter
DRD 26-5-1-6	Portfolio Management Improvement Plan	Due first 60 days after contract award; Quarterly
DRD 26-5-2-1	Legacy Application Disposition Plan (for Applications, Web Applications, Software, Web Services, and IT Systems)	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-5-2-2	Application Modernization Plan (for Applications, Web Applications, Software, Web Services, and IT Systems)	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-5-2-3	Application Rationalization Plan (for Applications, Web Applications, Software, Web Services, and IT Systems)	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-5-2-4	Legacy Application, Application Modernization, and Application Rationalization Plan/Strategy Status and Progress Report	Monthly

26.6 Website Portfolio & Website Portfolio Management

An effective practice of IT Management is technical management to include the management of websites. HQ ITCD requires portfolio management of websites. The contractor shall provide support and services in the management of the website portfolio.

26.6.1 Website Portfolio

The contractor shall develop, implement, and/or manage and maintain a portfolio of websites. The contractor shall define an application management strategy, methodology, framework, SOPs, and processes for maintaining accuracy of portfolio data, for maintenance of the portfolio, and management of the portfolio.

HQ ITCD requires a validation of website portfolio data to ensure a credible baseline of inventory and related portfolio data for HQ, ITCD, and customers. Attributes collected for the portfolio are to be approved and defined by NASA. The contractor shall review and determine

gaps in attributes captured and shall make recommendations for enhanced portfolio management. The contractor shall perform audits of the portfolio to determine corrective actions, issues, and potential risks. The contractor shall also provide a risk management plan for timely assessment and mitigation of technical debt, roadmaps, etc.

As part of the portfolio management support and services provided by the contractor, HQ ITCD requires that website modernization be strategized, planned, executed, and implemented.

26.6.2 Website Management

HQ ITCD requires that website management be performed in order to address technical risk, debt, and obsolescence. The contractor shall develop, manage/maintain, and execute a website management, modernization and disposition plan based on analysis conducted on websites, the website portfolio, the TRM, emerging technology, history of defects, security risks, etc.

The following DRDs are required for website portfolio management and website management.

DRD	Description	Frequency
DRD 26-6-1	Website Portfolio Management System (can be combined with the system for Applications, Web Applications, Software, Web Services, and IT Systems)	Due 30 days after contract award
DRD 26-6-2	Website Portfolio Management System Maintenance	Ongoing
DRD 26-6-3	Website Portfolio Management Strategy and Methodology	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-6-4	Website Portfolio Management Framework, SOPs, and Processes	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-6-5	Website Portfolio Management Standards	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently
DRD 26-6-6	Website Portfolio Audits and Reporting	Due first 60 days after contract award; Quarterly thereafter
DRD 26-6-7	Website Portfolio Management Improvement Plan	Due first 60 days after contract award; Quarterly
DRD 26-6-8	Website Modernization Plan	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently

DRD	Description	Frequency
DRD 26-6-9	Website Management Strategy and Plan (must support and integrate with content management strategy)	Due first 60 days after contract award; Updates Quarterly thereafter unless requested more frequently

26.7 Development and Design Analytics

26.7.1 Application, Software, Web Application and IT System Development and Design

a. Code reviews

The contractor shall develop and maintain standards and operating procedures for performing code reviews for newly developed code and changes to existing code. The contractor shall perform code reviews and make the results of code reviews available to the government via an electronic repository.

b. Standards, compliance, and audit checks

The contractor shall, as part of new development, change management for existing applications, software, and IT systems and operations and maintenance, perform compliance and audit checks to ensure adherence to NASA and ITCD policy and standards. The contractor shall make the results of compliance and audit checks available to the government via an electronic repository.

The contractor shall develop and maintain standards and operating procedures pertaining to the execution of application design reviews. The contractor shall develop, utilize, and ensure the use of design standards and design review compliance checklists. The contractor shall make available the results of design reviews to the government via an electronic repository.

c. UML

The contractor shall produce designs which are compliant with Universal Modeling Language (UML) 2.0 or above. Where there is no UML based artifact available for the design artifact being produced, the contractor shall also submit with the design a textual description which serves to aid in understanding the design artifact and any related design choices.

d. Sequence Diagrams

The contractor shall use sequence diagrams during design to convey component, module and or sub-system workflow sequences. The contractor shall ensure that produced sequence diagrams comply with the standard UML 2.0 or above.

e. Activity Diagrams

The contractor shall use activity diagrams during design to convey component, module and or sub-system interactivity. The contractor shall ensure that produced activity diagrams comply with the standard UML 2.0 or above.

f. Code Reuse

The contractor shall develop and perform configuration management for a library of reusable code snippets, user interface templates, software components and application program interfaces (APIs). The contractor shall develop and incorporate into development standards and operating procedures guidance and compliance checklists pertaining to the reuse of code for satisfying requirements that are solved via a reusable API or framework.

DRD	Description	Frequency
DRD 26-7-1-1	Code Review and Reporting	Ongoing
DRD 26-7-1-2	UMLs, Sequence Diagrams, and Activity Diagrams	Ongoing
DRD 26-7-1-3	Technology Review for Applications, Web Applications, Software, and IT Systems	Due first 60 days after contract award; ongoing thereafter
DRD 26-7-1-4	Application, Web Application, Software, and IT System Standards	Due first 60 days after contract award; Quarterly thereafter
DRD 26-7-1-5	Application, Web Application, Software, and IT System Audits	Due first 60 days after contract award; Quarterly thereafter
DRD 26-7-1-6	Development and Design Improvement Plan	Quarterly

Metric #	Description	Metric
Metric 26-7-1-1	Code Review and Reporting	The contractor shall meet 100% compliance with conducting code reviews for each release
Metric 26-7-1-2	UMLs, Sequence Diagrams, and Activity Diagrams	The contractor shall consistently develop UMLs, Sequence Diagrams, and Activity Diagrams for each enhanced, newly developed, and/or integrated application, software, web application, web service, and IT system. The contractor shall meet this requirement with 100% compliance, technical competency, discipline, and accuracy

26.7.2 Website Development and Design

a. Wireframe Design

Wireframes are used as a design tool to produce a prototype depiction of what the graphical user interface of a website could potentially look like. Wireframes can be used to depict website layout, website component and website flow sequencing. The contractor shall develop wireframes for websites to aid in user interface requirements documentation, validation and verification. The contractor shall ensure that all developed wireframes are annotated in such a manner to allow traceability to applicable requirements and test cases.

b. Website Development Technology Reviews

The contractor shall develop and maintain processes, standards and operating procedures pertaining to the review of technologies used in developing websites. The contractor shall ensure that all newly proposed websites and changes to existing websites are reviewed for compliance with the NASA HQ ITCD technology reference matrix (TRM) and technology stack. The contractor shall perform annual reviews of all website technology stacks for compliance with the TRM and technology stack. The contractor shall document the results of annual website technology reviews. The contractor shall make the results available to the government via an electronic repository.

c. Website Design Reviews

The contractor shall conduct design reviews for new, enhanced, and modernized websites. The contractor shall provide a design review report and shall develop an improvement plan to address deficiencies in website design.

d. Standards, compliance, and audit checks

The contractor shall, as part of new website development and both change and content management for existing websites perform frequent and regular compliance and audit checks to ensure adherence to NASA and ITCD website development and curation policy and standards. The contractor shall make the results of website compliance and audit checks available to the government via an electronic repository.

DRD	Description	Frequency
DRD 26-7-2-1	Technology Review for Websites Report	Due first 60 days after contract award; ongoing thereafter
DRD 26-7-2-2a	Website Standards Document	Due first 60 days after contract award; Quarterly thereafter
DRD 26-7-2-2b	Website Standards Compliance Report	Monthly

DRD	Description	Frequency
DRD 26-7-2-3	Website Audit Report	Due first 60 days after contract award; Quarterly thereafter
DRD 26-7-2-4	Website Design Review Report	Ongoing

Metric #	Description	SLA Metric
Metric 26-7-2-1	Code Review and Reporting	The contractor shall meet 100% compliance with the conducting code reviews for each release
Metric 26-7-2-2	UMLs, Sequence Diagrams, and Activity Diagrams	The contractor shall consistently develop UMLs, Sequence Diagrams, and Activity Diagrams for each enhanced, newly developed, and/or integrated application, software, web application, web service, and IT system. The contractor shall meet this requirement with 100% compliance, technical competency, discipline, and accuracy

26.8 Application and Website Architecture

The subsections below provide requirements for application and website architecture. Additional requirements will be provided as requested and/or based on metrics established for the services in this contract as well as the standards that the contractor enforces based on its corporate and industry practices.

26.8.1 Interface requirements

- The Contractor, in support of overall requirements management for systems, applications and websites, shall document, review, implement and support in the verification and validation of interface requirements for applications and websites;
- The contractor shall identify and document the nature and type of the interface requirement (e.g. internal, external, machine to machine, SOAP, REST, RPC, etc...);
- The contractor shall identify and document the direction of the data transferred across an interface;
- All such requirements shall be documented in the form of one or more interface control documents and placed under proper configuration management and quality assurance control.

26.8.2 Integration requirements

- a. The Contractor, in support of overall requirements management for systems, applications and websites, shall document, review, implement and support in the verification and validation of integration requirements for applications and websites;
- b. All such requirements shall be documented in the form of one or more interface control documents and placed under proper configuration management and quality assurance control.

26.8.3 Application Architecture

An application architecture is used to define the way in which an application is structured and provides graphical and textual descriptions of the different sub-systems, components and services of which an application is comprised.

- a. The contractor shall produce an application architecture for newly developed applications
- b. The contractor shall update and maintain existing application architectures for newly modified applications.
- c. Application architectures shall be documented in the form of one or more Software Architecture Document (SAD)s.
- d. The contractor shall ensure that the developed application architecture provides clear traceability to and accounts for all identified application requirements.
- e. The contractor shall ensure that the SAD addresses the following 4+1 views, viewpoints and cross cutting concerns
 - i. Use Case View
 - ii. Logical View
 - iii. Process View
 - iv. Physical View
 - v. Deployment View
 - vi. Data Model View (Conceptual, Logical, Physical, Data Dictionary)
 - vii. Security Compliance View
 - viii. Information Management Viewpoint
 - ix. Enterprise Architecture Compliance Viewpoint
- f. The contractor shall develop processes, procedures and checklists for maintaining, validating, and verifying application architectures.
- g. The contractor shall ensure implementation level traceability to and proper change management of application architectures.
- h. The contractor shall perform periodic reviews of application architectures and document findings for correction.

26.8.4 Data Models and Data Architecture (at the application level)

The contractor shall ensure that all applications comply with NASA ITCD data design requirements. The contractor shall maintain for existing systems and develop for newly developed applications the following artifacts to ensure compliance with the ITCD Enterprise Data Architecture:

- Data Dictionary
- Logical Data Model
- Conceptual Data Model
- Physical Data Model

26.8.5 Content Architecture for Websites

Content architecture (CA) for websites focuses on organizing, structuring, and labeling website content in an effective and sustainable manner with a goal of helping websites users to easily find the information they need in order to complete one or more tasks.

- a. The contractor shall develop and document a content architecture for newly developed websites.
- b. The contractor shall update and maintain existing content architectures for newly modified websites.
- c. The contractor shall develop processes, procedures and checklists for maintaining, validating, and verifying website content architectures.
- d. The contractor shall ensure proper implementation level traceability to and proper change management of website content architectures.
- e. The contractor shall perform periodic reviews of website content architectures and document findings for correction.

DRD	Description	Frequency
DRD 26-8-1	SAD to address the following views: <ol style="list-style-type: none">1. Use Case View2. Logical View3. Process View4. Physical View5. Deployment View6. Data Model View (Conceptual, Logical, Physical, Data Dictionary)7. Security Compliance View	Ongoing

DRD	Description	Frequency
	8. Information Management Viewpoint 9. Enterprise Architecture Compliance Viewpoint	
DRD 26-8-2	Application, Software, Web Service, and Web Application Architecture Standards	Ongoing
DRD 26-8-3	Content Architecture for Websites	Ongoing
DRD 26-8-4	Application, Software, Web Service, and Web Application Architecture Improvement Plan	Quarterly

Metric #	Description	Metric
Metric 26-8-1	<ul style="list-style-type: none"> Application, Software, Web Service, and Web Application Architecture Content Architecture 	The contractor shall develop SADs, Data Models, and Content Architectures for each enhanced, newly developed, and/or integrated application, software, web application, web service, IT system, and/or website. The contractor shall meet this requirement with 100% compliance, technical competency, discipline, and accuracy

26.9 Testing and Test Management

NASA HQ seeks to implement repeatable application and information development processes that minimize errors, leverages previously employed solutions and maximizes service delivery to the customer. Additionally, all defects noted by the government during acceptance testing and within 60 days after application/system/web service/product/website/etc. deployment are deemed application defects for the purposes of this contract and shall be remedied at no cost to the government. Defects shall be defined as:

- Baseline Defects: the number of defects documented at the time of transition.
- Release Defects: defects identified after deployment that are introduced as the result of new or modified code, back end changes, or modification in application configuration. (ITCD reserves the right to update this definition based on the

application portfolio. As the types of applications and their architectures change, review of the Release Defect definition shall be required.).

(Definitions and criteria for defect identification and determination will be reviewed and modified by the government and the contractor shall comply with revised and new definition and criteria.)

To ensure project deliverables meet NASA HQ quality standards, the contractor shall:

- a. Establish, update and adhere to a method and process for code and system peer review;
- b. Develop and deliver a test plan for each project, regardless of project size or complexity including a pre and post deployment acceptance period;
- c. Validate requirements and design specifications;
- d. Complete all testing prior to government acceptance testing;
- e. Ensure products for acceptance testing includes a formalized assurance report as part of the documentation from contractor that confirms all requirements and design specifications have been met and the project is ready to be deployed in production, report should include test results and findings;
- f. Be responsible for delivering a quality product as measured by the customer.

Application, system, web services, websites, products, etc. performance is measured at the user interface level based on customer impact. The contractor shall:

- a. Recommend performance metrics; provide tools and perform systems, performance, tuning, and capacity analysis studies for applications;
- b. Use modeling and/or simulation techniques to quantify sizing of required resources;
- c. Identify and recommend system optimize opportunities and strategies; and
- d. Include performance planning approach in application design documentation.

The contractor shall establish and/or define, maintain, and/or manage a test environment and a test lab (in the HQ ITCD cloud environment, in HQ on-site, and the contractor's office location) for validation and verification of modifications, enhancements, modernization, development, consolidation, integration, configuration, and retirement activities for applications, software, websites, web applications, web services, and IT systems. Consequently, the contractor shall maintain and manage the development, testing, staging, and R&D environments accordingly to ensure alignment with the production environment as well as to ensure accurate simulation of the user roles in the aforementioned environments.

26.9.1 Application Testing

The contractor shall perform application testing for all newly developed and existing applications, software, web applications, web services, and/or IT systems. The contractor shall perform the following types of testing as required:

- Developer Unit Testing
- Integration Testing
- Regression Testing

- Performance Testing
- Security Testing
- Functional Testing
- Automated testing

The contractor shall develop and/or maintain test suites for newly developed and existing applications, software, web applications, web services, and/or IT systems. The contractor shall implement tools and systems for automation of testing and shall perform automated testing. The contractor shall document via the creation of one or more test plans the following:

- Test cases
- Test case to requirement traceability matrix
- Test cases results
- Testing environment specifications
- Listing of any noted anomalies or defects

The contractor shall make available to the government all test plans, test cases, test environment specifications and noted defects via an electronic repository provided by the government. The contractor shall evaluate new technology for improved testing and test management. The contractor shall provide reporting and mitigation plans from testing.

The contractor shall support user acceptance testing and shall comply with independent verification and validation success criteria for applications, software, web applications, web services, and/or IT systems.

26.9.2 Mobile Application Testing

The contractor shall perform mobile application testing for newly developed mobile applications and existing mobile applications to which changes are being made. The contractor shall perform the following types of testing for mobile applications as required:

- Developer Unit Testing
- Integration Testing
- Regression Testing
- Performance Testing
- Security Testing
- Functional Testing
- Automated testing

The contractor shall develop and maintain test suites for newly developed and existing mobile applications. The contractor shall implement tools and systems for automation of testing and shall perform automated testing. The contractor shall document via the creation of one or more test plans the following:

- Test cases
- Test case to requirement traceability matrix

- Test cases results
- Testing environment specifications
- Listing of any noted anomalies or defects

The contractor shall make available to the government all test plans, test cases, test environment specifications and noted defects via an electronic repository. The contractor shall provide reporting and mitigation plans from mobile application testing.

The contractor shall support user acceptance testing and independent verification and validation testing for mobile applications.

26.9.3 Website Testing

The contractor shall perform website testing for newly developed websites and existing websites to which changes are being made. The contractor shall perform the following types of testing for websites as required:

- Usability Testing
- Browser Compatibility Testing
- 508 Accessibility Testing
- Dead link Testing
- Performance Testing
- Security Testing

The contractor shall develop and maintain test suites for newly developed and existing websites. The contractor shall implement tools and systems for automation of testing and shall perform automated testing.

The contractor shall document via the creation of a Website Test Plan (WTP) the following:

- Test cases
- Test case to requirement traceability matrix
- Test cases results
- Testing environment specifications
- Listing of any noted anomalies or defects

The contractor shall make available to the government all test plans, test cases, test environment specifications and noted defects via an electronic repository. The contractor shall provide reporting and mitigation plans from website testing.

26.9.4 System Testing

The contractor shall perform system testing for newly developed systems and existing systems to which changes are being made. The contractor shall perform the following types of testing for systems as required:

- Developer Unit Testing
- Integration Testing
- Regression Testing
- Performance Testing
- 508 Accessibility Testing
- Security Testing
- Functional Testing
- Automated testing

The contractor shall develop and maintain test suites for newly developed and existing systems.

The contractor shall document via the creation of a Test and Evaluation Master Plan (TEMP) the following:

- Test cases
- Test case to requirement traceability matrix
- Test cases results
- Testing environment specifications
- Listing of any noted anomalies or defects

The contractor shall make available to the government all test plans, test cases, test environment specifications and noted defects via an electronic repository. The contractor shall implement tools and systems for automation of testing and shall perform automated testing.

The contractor shall support user acceptance testing and independent verification and validation testing for systems. The contractor shall provide reporting and mitigation plans from system testing.

26.9.5 IV&V support (provide data to the IV&V team and respond to requested actions, issues, and defects)

The contractor shall provide support to and comply with NASA HQ ITCD IV&V standards, policies, procedures and activities. This includes but is not limited to the following:

- Providing requested data to the IV&V team
- Responding to requested actions from the IV&V team
- Reviewing, and addressing issues, and defects found during the IV&V process
- Attending IV&V related events, meetings and gate reviews

26.9.6 Testing Desktop Builds/Images, Browser Upgrades, Enterprise Application Releases, Etc.

The contractor shall test new and modified desktop builds/images to determine impacts, defects, triage, etc. needed to applications, software, websites, IT systems, etc. To support upgrades provided by Agency service providers such as (but not limited to) the End User Services Office, the contractor shall test proposed upgrades against HQ applications, web applications, software, etc. to ensure awareness of potential issues and appropriate and timely mitigation of risk.

Additionally, the contractor shall test and/or support the testing of enterprise applications to ensure awareness and reporting of potential issues and timely mitigation of risk. Enterprise applications shall be tested from perspectives such as:

- As users to identify defects with proposed releases
- As O&M providers of the HQ environment to identify issues with enterprise applications and compatibility and integration issues with browsers, client installation requirements, etc.

The following is a list of deliverables for section 26.9 and its subsections.

DRD	Description	Frequency
DRD 26-9-1	Test Management System Maintenance Report	Quarterly
DRD 26-9-2	Test Management Framework, Plan, and SOPs	Due 30 days after contract award; updates due quarterly thereafter
DRD 26-9-3	Test Scripts and Test Cases (repository for each application, software, web application, web service, mobile application, website, and IT system)	Ongoing
DRD 26-9-4a	Defect Documentation and Reporting (for each application, software, web application, web service, mobile application, website, and IT system)	Ongoing
DRD 26-9-4b	Final Test Report (for each application, software, web application, web service, mobile application, website, and IT system)	Ongoing
DRD 26-9-5a	Testing Solution and Tools (Utilization, Enhancement, Augmentation/Integration,	Quarterly

DRD	Description	Frequency
	Maintenance and Assessment) Roadmap	
DRD 26-9-5b	Testing Solution and Tools (Utilization, Enhancement, Augmentation/Integration, Maintenance and Assessment) Report	Due 30 days after contract award; quarterly thereafter
DRD 26-9-6a	Test Lab	Due 15 days after contract award
DRD 26-9-6b	Test Lab Maintenance Roadmap	Quarterly
DRD 26-9-6c	Test Lab Maintenance Report	Monthly
DRD 26-9-6d	Test Lab Specifications and Requirements	Monthly
DRD 26-9-7a	IV&V Data	Ongoing
DRD 26-9-7b	IV&V Issue Resolution and Risk Mitigation Report	Ongoing
DRD 26-9-8a	Test Environment	Due 15 days after contract award
DRD 26-9-8b	Test Environment Maintenance Roadmap	Quarterly
DRD 26-9-8c	Test Environment Maintenance Report	Monthly
DRD 26-9-8d	Test Environment Specifications and Requirements	Monthly
DRD 26-9-9	Issue, Defect, and Risk Reporting for Enterprise Applications	Ongoing

Metric #	Description	Metric
Metric 26-9-1	<ul style="list-style-type: none"> Application, Software, Web Service, and Web Application Architecture Content Architecture 	The contractor shall consistently develop SADs, Data Models, and Content Architectures for each enhanced, newly developed, and/or integrated application, software, web application, web service, IT system, and/or website. The contractor shall meet this requirement with 100% compliance, technical competency, discipline, and accuracy.

HQ ITCD reserves the right to assess, define, establish, and enforce service level agreements related to testing and test management at a future date. The contractor shall assist HQ ITCD in defining the service level agreements for testing and test management.

26.10 Application/Software, Web Service, Web Application, IT System & Website Deployment

Application and website deployment is concerned with promoting a newly created or newly modified application, web application, software, web service, IT system, or website from a lower environment to a higher environment (e.g. from staging to production) in an effort to make the application or website available for operational use to a set of users and stakeholders.

Pertaining to application, mobile applications, and website deployment the contractor shall:

- Develop and document processes, procedures and checklists pertaining to the automated deployment of applications, software, web application, IT Systems, and web service;
- Develop and document processes, procedures and checklists pertaining to the automated deployment of websites;
- Ensure that all documented processes, procedures and checklists include all related activities, roles, key performance indicators, tools and external dependencies;
- Implement, document and maintain tools used for automated deployments of applications, software, web application, IT Systems, and web service;
- Implement, document and maintain tools used for automated deployments of websites;
- Implement, document and maintain tools used for continuous deployment of applications, software, web application, IT Systems, and web service deployments;
- Implement, document and maintain tools used for continuous deployment of website deployments;
- Implement, document and maintain tools used for automated verification and validation of applications, software, web application, IT Systems, and web service deployments;
- Implement, document and maintain tools used for automated verification and validation of website deployments;
- Develop and document processes as well as implement and maintain tools to address logging events.

The contractor shall track and make available to NASA HQ ITCD all process and procedure related metrics for success and failure to include key performance indicators and measures of effectiveness.

DRD	Description	Frequency
DRD 26-10-1	Processes, procedures and checklists pertaining to the automated deployment of	Due 45 days after contract award; updates due quarterly

DRD	Description	Frequency
	applications, software, web application, IT Systems, and web service	
DRD 26-10-2	Processes, procedures and checklists pertaining to the automated deployment of websites	Due 45 days after contract award; updates due quarterly
DRD 26-10-3	Processes, procedures and checklists include all related activities, roles, key performance indicators, tools and external dependencies	Due 45 days after contract award; updates due quarterly
DRD 26-10-4	Implement, document and maintain tools used for automated deployments of applications, software, web application, IT Systems, and web service	Due 45 days after contract award; updates due quarterly
DRD 26-10-5	Implement, document and maintain tools used for automated deployments of websites	Due 45 days after contract award; updates due quarterly
DRD 26-10-6	Implement, document and maintain tools used for continuous deployment of a applications, software, web application, IT Systems, and web service deployments	Due 45 days after contract award; updates due quarterly
DRD 26-10-7	Implement, document and maintain tools used for continuous deployment of website deployments	Due 45 days after contract award; updates due quarterly
DRD 26-10-8	Implement, document and maintain tools used for automated verification and validation of applications, software, web application, IT Systems, and web service deployments	Due 45 days after contract award; updates due quarterly
DRD 26-10-9	Implement, document and maintain tools used for automated verification and validation of website deployments	Due 45 days after contract award; updates due quarterly

26.11 Database Management

Database management involves the monitoring, administration, and maintenance of one or more databases and database groups within an organization.

The contractor shall provide database management capabilities and perform database management activities.

Pertaining to database management activities the contractor shall perform but are not limited to:

- Install, configure and upgrade database server software and related products as required
- Develop and execute database backup and recovery processes and procedures
- Perform database security management
- Perform database optimization
- Perform database performance management
- Maintain all existing NASA HQ ITCD databases and database management systems in development, testing, staging and production environments
- Manage user and system level access and permissions to development, testing, staging and production databases as required
- Design, structure, and maintain additional databases as required in support of the development of new applications
- Identify and mitigate vulnerabilities and risks
- Maintain the integrity of the data in all databases under their responsibility
- Maintain all current data masking scripts
- Create additional data masking scripts as required
- Perform data extractions from production database servers as required for troubleshooting in a lower environment
- Apply data masking scripts to sensitive production data as required
- Schedule and perform daily database backups and perform database recoveries as required
- Provide NASA HQ ITCD data and information pertaining to the health of production database management systems as required
- Monitor the vendor support lifecycles of the database management systems currently approved for use within the NASA HQ ITCD environment
- Regularly monitor and notify NASA HQ ITCD of vendor plans to stop support of currently used database management systems
- Develop migration strategies and transition plans for moving from physical or virtual based technologies and environments into cloud based technologies
- Implement Center for Internet Security (CIS) controls and system baselines for newly recommended database management systems
- Remain current on new trends in database management and related database management systems

26.12 Application Analytics

The contractor shall collect, maintain, and report analytics on applications, web services, web applications, mobile applications, and software (including COTS products) to support analysis, corrective actions, risk mitigation, and performance for improved technical management, operations and maintenance.

The contractor shall define the analytics and shall validate relevancy of analytics collected periodically. The contractor shall also provide and maintain analytics tools for applications. Analytics shall be stored in a repository (approved and owned by HQ ITCD) shall be developed, implemented, and/or maintained by the contractor.

DRD	Description	Frequency
DRD 26-12-1	Analytics Repository	Due within 90 days after contract award; updates and maintenance are ongoing
DRD 26-12-2	Analytics Repository Maintenance Roadmap	Quarterly
DRD 26-12-3	Analytics Validation and Findings	Ongoing
DRD 26-12-4	Application, Web Services, Web Application, Mobile Application, and Software Performance Report	Quarterly

26.13 Website Analytics

The contractor shall collect, maintain, and report analytics on websites to support analysis, corrective actions, risk mitigation, and performance for improved technical management, operations and maintenance.

The contractor shall define the analytics and shall validate relevancy of analytics collected periodically. Analytics shall be stored in a repository (approved and owned by HQ ITCD) shall be developed, implemented, and/or maintained by the contractor.

DRD	Description	Frequency
DRD 26-13-1	Analytics Repository	Due within 90 days after contract award; updates and maintenance are ongoing
DRD 26-13-2	Analytics Repository Maintenance Roadmap	Quarterly
DRD 26-13-3	Analytics Validation and Findings	Ongoing
DRD 26-13-4	Website Performance Report	Monthly

26.14 System Analytics

The contractor shall collect, maintain, and report analytics on IT systems to support analysis, corrective actions, risk mitigation, and performance for improved technical management, operations and maintenance. The contractor shall also collect data on system performance, reliability, as availability as well as transactional behavior to determine needed triage, modernization, architecture changes, etc.

The contractor shall define the analytics and shall validate relevancy of analytics collected periodically. Analytics shall be stored in a repository (approved and owned by HQ ITCD) shall be developed, implemented, and/or maintained by the contractor.

DRD	Description	Frequency
DRD 26-14-1	Analytics Repository	Due within 90 days after contract award; updates and maintenance are ongoing
DRD 26-14-2	Analytics Repository Maintenance Roadmap	Quarterly
DRD 26-14-3	Analytics Validation and Findings	Ongoing
DRD 26-14-4	System Performance Report	Monthly

26.15 Change Management & Configuration Management for Applications, Websites, Web Services, and Systems

The Contractor shall develop, implement and maintain standards and operating procedures for change and configuration management.

The Contractor shall develop, deliver and maintain a Configuration Management Plan for applications, mobile applications, web-applications and websites.

The Contractor shall maintain a library of accurate and up-to-date change, configuration management and related technical data, to include such items as documentation updates, as-built software architecture diagrams and software architecture diagram updates with field and design changes.

The Contractor shall make all change and configuration management data available to the government via an electronic repository.

DRD	Description	Frequency
DRD 26-15-1	Code Repository	Ongoing
DRD 26-15-2	Code Repository Maintenance and Updates	Ongoing
DRD 26-15-3	Configuration Management Plan for Applications, Websites, Web Applications,	Due within 90 days after contract award; updates and maintenance quarterly

DRD	Description	Frequency
	Mobile Applications, Web services, and Systems	
DRD 26-15-4	Change Management Plan for Applications, Websites, Web Applications, Mobile Applications, Web services, and Systems	Due within 90 days after contract award; updates and maintenance quarterly

26.16 Quality Assurance (QA) and Quality Control (QC) for Application, Systems, Website, and Web Services

26.16.1 Products, Attribute Data, and Artifacts

The contractor shall ensure quality of products, attribute data, and artifacts related to applications, systems, websites, and web services. It is expected that the products related to applications, systems, websites, and web services meet NASA HQ ITCD criteria for quality and criteria established by the contractor's QA and QC of services and support provided for applications, systems, websites, and web services. Accuracy of attribute data for applications, systems, websites, and web services shall be maintained in support of (but not limited to) the NASA HQ ITCD application/website/web service portfolio, the NASA HQ ITCD Technical Reference Model (TRM), NASA HQ ITCD's technology roadmap and modernization plan, the Agency's Application Portfolio, and the Agency's repository of web applications, applications, websites, and systems (STRAW).

The contractor shall maintain accuracy of changes to products, attribute data, assets, configuration items (CIs), and artifacts related to applications, systems, websites, and web services. The contractor shall demonstrate maturity in Quality Control and Quality Assurance through the following requirements:

- A documented framework, SOP, and processes for QC
- A documented framework, SOP, and processes for QA
- A Quality Assurance Plan (QAP) for products, attribute data, configuration items, and artifacts related to and supporting applications, systems, websites, and web services. The plan must address QA at the work request, ticket, release, project, and service levels
- A Quality Control Plan (QCP) for products, attribute data, configuration items, and artifacts related to and supporting applications, systems, websites, and web services. The plan must address QC at the work request, ticket, release, project, and service levels
- Both the QAP and QCP must identify the evaluations to be performed, audits and reviews to be performed, standards that are applicable to the project, procedures for reporting errors and for tracking errors, documents to be produced, compliance with policy, cost of noncompliance items/issues/defects, and corrective action processes
- A reporting mechanism and defined report data for communicating noncompliance and issues to senior management

- Incorporate a sample driven review process for QC and QA:
 - 1. Inspect a fraction of each product, attribute data, configuration items, and artifacts related to applications, systems, websites, and web services.
 - 2. Develop an estimate of the number of faults within each product, attribute data, configuration items, and artifacts for applications, systems, websites, and web services.
 - 3. Sort the product, attribute data, configuration items, and artifacts by the estimate of faults for each application, system, website, and web service.
 - 4. Address and mitigate:
 - a. faults and noncompliance for the products that have the highest estimated number of faults and noncompliance items
 - b. faults and noncompliance for the attribute data that have the highest estimated number of faults and noncompliance items
 - c. faults and noncompliance for the configuration items that have the highest estimated number of faults and noncompliance items
 - d. faults and noncompliance for the artifacts that have the highest estimated number of faults and noncompliance items
- Provide a repository for QA and QC metrics and data. The repository shall have intelligence and taxonomy as well as must support business intelligence, ITIL service operations and continuous improvement processes, integration with other systems and applications implemented by or for HQ ITCD in support of IT Management and other standards and processes required for this contract.
- Provide a repository for root cause of faults and noncompliance for products, attribute data, configuration items, and artifacts for applications, systems, websites, and web services such as:
 - Incomplete or erroneous specifications
 - Incomplete or erroneous content, data, and information
 - Intentional deviation from specifications
 - Violation of standards and best practices
 - Error in data representation
 - Inconsistent interface component
 - Error in design logic
 - Inaccurate or incomplete documentation
 - Incomplete testing or test documentation
 - Miscellaneous

Repository shall also collect and track the total number of faults and noncompliance as follows:

- Total
- Severe
- Moderate

- Minor

26.16.2 Reliability and Performance of Applications, Websites, Systems, and Web Services

The contractor shall measure, document, track, and manage reliability and performance of applications, websites, systems, and web services. Reliability for applications, websites, systems, and web services is defined as the failure free operation of an application, website, system, and web service. Failure is defined as nonconformance to requirements. Within this definition of failure, the contractor shall work with NASA HQ ITCD to determine the levels of failure severity. This activity of determining failure severity levels shall be reviewed annually to ensure consideration to new/changing technology, new/changing platforms, new/changing designs and architecture, new/changing standards, etc. As such severity levels for failure, the measurement of reliability, and performance of applications, systems, websites, and web services are somewhat dependent upon hardware and network reliability and performance, the contractor shall develop a methodology for measuring reliability and performance as well as for addressing issues that include but is not limited to

- Hardware and virtual ware reliability and performance
- Network reliability and performance
- Design and architecture problems (applicable to both infrastructure and applications/systems/websites/web services)
- Implementation problems (applicable to both infrastructure and applications/systems/websites/web services)

26.16.2 Availability of Applications, Websites, Systems, and Web Services

The contractor shall measure, document, track, and manage availability of applications, websites, systems, and web services. Availability is defined as the measurement (probability) that an application, website, system, and/or web service is operating according to requirements. The contractor shall develop a methodology for measuring availability of applications, websites, systems, and web services as well as for addressing issues related to availability that includes but is not limited to

- Hardware and virtual ware reliability and performance
- Network reliability and performance
- Design and architecture problems (applicable to both infrastructure and applications/systems/websites/web services)
- Implementation problems (applicable to both infrastructure and applications/systems/websites/web services)

26.16.3 Quality Assurance & Control System

The contractor shall develop, implement, manage, and maintain a quality assurance system and a quality control system for capturing the organizational structure, responsibilities, procedures, processes, and resources for implementing managing, and executing quality management. The

system shall also address management responsibility, contract review, design control, document and data control, product identification and traceability, process control, inspection and evaluation, corrective and preventive action, control of quality records, internal quality audits, training, and application, website, system, and web service reviews.

26.16.4 Quality Assurance & Control Plan

The contractor shall develop, implement, execute, manage, and maintain a quality assurance plan and a quality control plan. These plans provide guidance for implementing, managing and executing quality assurance and quality control for applications, systems, websites, and web services. The plan shall also provide a template for quality assurance and quality control activities and related artifacts.

The following are the deliverables for section 26.16 and its subsections:

DRD	Description	Frequency
DRD 26-16-1	Quality Assurance Framework, SOP, and Processes	Due 30 days after contract award; updates due quarterly
DRD 26-16-2	Quality Control Framework, SOP, and Processes	Due 30 days after contract award; updates due quarterly
DRD 26-16-3	Quality Assurance Plan	Due 30 days after contract award; updates due quarterly
DRD 26-16-4	Quality Control Plan	Due 30 days after contract award; updates due quarterly
DRD 26-16-5	Quality Assurance System and Repository of QA Data	Due 30 days after contract award;
DRD 26-16-6	Quality Control System and Repository of QC Data	Due 30 days after contract award;
DRD 26-16-7	Repository for Root Cause of Faults and Non-Compliance	Due 30 days after contract award;
DRD 26-16-8	Quality Assurance System Maintenance and Repository of QA Data Updates	Due 30 days after contract award; updates due quarterly
DRD 26-16-9	Quality Control System Maintenance and Repository of QC Data Updates	Ongoing
DRD 26-16-10	Repository for Root Cause of Faults and Non-Compliance Maintenance (of system and data)	Ongoing
DRD 26-16-11	Reliability Report	Monthly
DRD 26-16-12	Availability Report	Monthly

26.17 Usability and Related User Interface Requirements

The contractor shall comply with Section 508 of the Rehabilitation Act (29 U.S.C. 794.d) as amended by the Workforce Investment Act of 1998 (P.L. 105-220). Section 508 was enacted to eliminate barriers in information technology, open new opportunities for people with disabilities, and encourage development of technologies that shall help achieve these goals.

The contractor shall ensure, unless an undue burden would be imposed on NASA, that systems they develop, procure, maintain, or utilize electronic and information technology be accessible to:

- Individuals with disabilities, who are NASA employees, have access to and use of information and data that is comparable to the access to and use of the information and data by NASA employees who are not individuals with disabilities; and
- Individuals with disabilities, who are members of the public seeking information or services from NASA, have access to and use of information and data that is comparable to the access to and use of the information and data by such members of the public who are not individuals with disabilities.

The contractor shall comply with Section 508 technical standards for all EIT they develop, procure, and maintain. This includes the following technologies:

- Software applications and operating systems
- Web-based information or applications
- Telecommunication products
- Video and multimedia products
- Self contained, closed products (e.g., information kiosks); and
- Desktop and portable computers

The contractor shall establish a framework, methodology, and tools for assessing, evaluating, testing, validating, and verifying accessibility and usability of applications, software, websites, web applications, mobile applications, IT systems, etc. The contractor shall:

- Develop, implement and maintain standards for usability pertaining to the development of applications, mobile applications, web-applications and websites, etc.
- Develop, implement and maintain standards for developing user interfaces for applications, mobile applications, web-applications and websites, etc.
- Incorporate into design and development activities best practices and standards for usability and human factors engineering.
- Maintain a collection of tools, software, techniques, and standards to support accessibility and usability assessments, testing, and evaluations
- Evaluate, implement, and integrate new technology to ensure testing and assessments are accurate.
- Perform reviews to ensure compliance with usability and user interface standards.
- Make available to the government all instances of non-compliance and proposed actions for remediation via an electronic repository.

To ensure that everyone with disabilities has access to and use of information and data, comparable to that of the employees and members of the public without disabilities, all developed applications shall meet the standards regulated by Section 508 of the Rehabilitation Act of 1973.

Furthermore, all developed applications:

- Shall have a 508 accessibility report submitted to the government in Portable Document Format (PDF)
- Shall be error-free when checked on these accessibility factors:
 - Alternative descriptions provided
 - Text language is specified
 - Reliable character encoding is provided
 - All content is contained in the application structure
 - All form fields have descriptions
 - Tab order is consistent with structure order
 - List and table structure is correct

DRD	Description	Frequency
DRD 26-17-1	508, Accessibility, and Usability Methodology, Framework, SOP, and Processes	Due 30 days after contract award; updates due quarterly
DRD 26-17-2	508, Accessibility, and Usability Management Plan	Due 30 days after contract award; updates due quarterly
DRD 26-17-3	508, Accessibility, and Usability Tool Solution Specification	Due 30 days after contract award; updates due monthly
DRD 26-17-4	Innovation and Technology Assessment Plan	Due 30 days after contract award; updates due quarterly
DRD 26-17-5	508, Accessibility, and Usability System and Repository of Findings and Related Data	Due 30 days after contract award; Updates Monthly
DRD 26-17-6	Compliance and Risk Audits	Due 30 days after contract award; Quarterly thereafter

26.18 Software and License Management

NASA HQ ITCD requires that software, licenses, maintenance and support agreements be inventoried, tracked, and managed to ensure improved IT Management and Asset Management. The contractor shall perform software management and license management services to ensure the software is upgraded, patched, and maintained in a proactive manner. Through performance of software management and license management, the contractor shall support, provide input to, and assist with the execution of modernization strategy and TRM processes.

26.18.1 Software Management

Software management is the process through which software is analyzed, assessed, tested, and/or evaluated to

- Determine and proactively manage supported software versions,
- Identify and mitigate risk to applications, systems, and/or infrastructure
- Identify modernization needs
- Identify, manage, and address constraints and deficiencies in integration capabilities and reusability

The contractor shall develop a software management SOP that shall be utilized to execute and perform the software management requirements of this contract. The software management SOP shall complement related ITCD SOPs and processes.

For the purposes of this contract, software management not only applies to just software, but also applies to any tool, product, COTS, application, O/S, technology, etc. utilized in the development, design, configuration, testing, hosting, analysis, integration, change management, monitoring, etc. of any website, portal, system, web service, and data warehouse.

26.18.1.1 Version management

The contractor shall manage versions of software, product, COTS, tools, applications, O/S, technologies, etc. for all HQ ITCD developed, configured, supported, hosted, managed, and maintained software, products, COTS, tools, applications, O/S, technology, etc. The contractor shall implement a technical solution for inventorying, tracking, and managing versions of software, products, COTS, tools, applications, O/S, technologies, etc. that either leverages existing HQ ITCD asset management systems or integrates with existing HQ ITCD asset management systems.

The contractor shall capture data on versions of software, products, COTS, tools, applications, O/S, technology, etc. such as, but not limited to the following:

- Name
- Acronym (if applicable)
- Type of software, application, COTS, tools, O/S, technology, etc.
- Description of capabilities
- Manufacturer/vendor
- Current Version
- Current Service Pack Number
- Date of Current Version Implementation
- Date of Current Service Pack Implementation
- Future or Next Version
- Release Notes for Future or Next Version
- Availability Date of Future or Next Version
- Future or Next Service Pack Number
- Release Notes for Future or Next Version

- Availability Date of Future or Next Service Pack Number
- Recommended deadline for implementing future or next version
- Recommended deadline for implementing future or next service pack
- Specific Utilization and Implementation in the HQ ITCD environment (specific development, configuration, systems, applications, COTS, products, websites, web services, integrations, reporting, etc. for which the version and/or service pack is managed as well as specific HQ ITCD environments (development, testing, staging, R&D, production, etc. in which the version and/or service pack is implemented.)
- Risks with Current Versions and Service Packs
- Constraints with Current Versions and Service Packs
- Risks with Future or Next Versions and Service Packs
- Constraints with Future or Next Versions and Service Packs
- Test Date of Future or Next Version
- Test Findings of Future or Next Service Pack
- Test Date of Future or Next Service Pack
- Test Findings of Future or Next Service Pack

The contractor shall provide a monthly report containing aforementioned data as well as findings on upcoming changes in versions of software, products, COTS, tools, applications, O/S, technology, etc. The contractor shall also maintain accurate version management data and shall conduct cyclical audits of this data against inventory of production environment. The contractor shall report errors in version management data and shall correct data through HQ ITCD governance and related processes.

26.18.1.2 Upgrades and Service Packs/Patching

The contractor shall analyze, test, document results, identify risks, recommend risk mitigation, and prepare plans and schedules for each upgrade and service pack. Upon vetting with and approval from the government, the contractor shall implement upgrades and service packs. The contractor shall vet the plans and schedules associated with upgrades and service packs through HQ ITCD governance and required supporting processes. The contractor shall prepare the plans and schedules for upgrades and service packs (60 days for service packs and 120 days for upgrades) in advance. Therefore, the contractor shall maintain close synergy and communication with the manufacturers/vendors and ITCD to ensure proactive response to upgrade and service pack findings, risks, and requirements. Consequently, the contractor shall maintain and manage the development, testing, staging, and R&D environments accordingly to ensure alignment with the production environment as well as to ensure accurate behavior of upgrades and service packs in the aforementioned environments. Plans and schedules shall demonstrate synergy and management of upgrade and services packs across these environments.

26.18.1.3 Risk Management

An awareness of and a planned mitigation of risks identified with new versions of software, products, COTS, tools, applications, O/S, technology, etc. is an essential activity for the management of software. The contractor shall perform risk management of current and future versions and service packs of software, products, COTS, tools, applications, O/S, technology, etc. The contractor shall develop a risk management plan and SOP for identifying, reporting, communicating, managing and mitigating risk related to version management.

26.18.2 License management

The contractor shall manage licenses, license models, license allocation, license support/maintenance/subscription agreements, and risks associated with change management. The contractor shall provide support to HQ ITCD in the procurement of licenses to support management of investments and to ensure appropriate identification of requirements.

26.18.2.1 Inventory Management and Maintenance

The contractor shall conduct inventory of all licenses applicable to all HQ ITCD developed, configured, supported, hosted, managed, and maintained software, products, COTS, tools, applications, O/S, technology, systems, etc. The contractor shall capture the following data such as, but not limited to:

- Software, product, COTS, tool, application, O/S, technology Name
- Software, product, COTS, tool, application, O/S, technology Description
- Manufacturer/Vendor
- Manufacturer/Vendor License POC
- Procurement Method (e.g. NASA NSSC, Sole Source, RFP, etc.)
- Purchase Request Number(s)
- License Model
- License Type
- License Number
- Number of Licenses
- Purchase Price Per License
- Support/Maintenance/Subscription Agreement (Y/N)
- Support/Maintenance/Subscription Agreement
- Annual Support/Maintenance/Subscription Renewal Price(s)
- Annual Support/Maintenance/Subscription Expiration Date(s)
- ITCD POC(s)/Technical POC(s)
- Invoice(s)
- Notes
- Risks

The contractor shall maintain license inventory data and shall develop, implement, and/or enhance a technical solution for license inventory and management.

The contractor shall provide a monthly report containing aforementioned data as well as indication of upcoming changes in licensing of software, products, COTS, tools, applications, O/S, technology, etc. communication by the manufacturer, vendor, and/or agency. The contractor shall also maintain accurate license management data and shall conduct cyclical audits of this data against inventory of production environment. The contractor shall report errors in license management data and shall correct data through HQ ITCD governance and related processes.

The contractor shall review license and support/maintenance/subscription agreement expirations with HQ ITCD monthly. The contractor shall provide data to support HQ ITCD in its decision making regarding licenses and support/maintenance/subscription agreements starting 7 months prior to license and support/maintenance/subscription agreement expiration. The contractor shall provide support to HQ ITCD in the procurement process for license and support/maintenance/subscription purchases and renewals. The contractor shall ensure that information and support required for license and support/maintenance/subscription purchases and renewals and other related actions (including discontinuance of agreements) are initiated 60 days prior to expiration or within vendor required notification. Therefore, the contractor shall maintain close synergy and communication with the manufacturers/vendors and ITCD to ensure proactive response to license and support/maintenance/subscription purchases, renewals, discontinuance, etc.

The contractor shall also develop and execute an ITCD HQ License Management Plan and SOP to ensure consistent management of licenses, license support, maintenance, and subscription agreements.

26.18.2.2 License Model Management

An awareness of and a planned mitigation of risks identified with license types, license models, number of licenses, etc. is an essential activity for the management of software. The contractor shall perform risk management of license models, license types, number of licenses, and distribution/utilization of licenses for software, products, COTS, tools, applications, O/S, technology, etc. The contractor shall develop a risk management plan and SOP for identifying, reporting, communicating, managing and mitigating risk related to license and license model management. The contractor shall analyze license models implemented for each software, system, web service, website (if applicable), COTS, tool, application, etc. and shall provide a License Model Management Findings and Recommendation Report. The contractor shall also make recommendations on types of licenses, number of licenses, license model, allocation of licenses for production and non-production environments, and support/maintenance/subscription agreements to support new/initial procurements.

The contractor shall maintain license models and shall vet needed changes through HQ ITCD governance and related processes.

The following is a list of deliverables for section 26-18 and its subsections:

DRD	Description	Frequency
DRD 26-18-1	Software Management SOP	30 days after contract award; updates quarterly
DRD 26-18-2	Version Management – Technical Solution	60 days after contract award
DRD 26-18-3	Version Management Report	30 days after contract award; monthly thereafter
DRD 26-18-4	Upgrade Plans and Schedules	Developed 120 days prior to manufacturer/vendor release
DRD 26-18-5	Service Pack Plans and Schedules	Developed 60 days prior to manufacturer/vendor release
DRD 26-18-6	Version Management Data Error Report	60 days after contractor award; monthly thereafter
DRD 26-18-7	Version Management Risk Management Plan	30 days after contract award; updates quarterly
DRD 26-18-8	Version Management Risk Management SOP	30 days after contract award; updates quarterly
DRD 26-18-9	License Management Plan	Due 30 days after contract award; updates quarterly
DRD 26-18-10	License Management SOP	Due 30 days after contract award; quarterly thereafter
DRD 26-18-11	License Management – Technical Solution	Due 60 days after contract award; maintenance ongoing
DRD 26-18-12	License Management Risk Management Plan	30 days after contract award; updates quarterly
DRD 26-18-13	Monthly License Management Report	30 days after contract award; monthly thereafter
DRD 26-18-14	License Management Data Error Report	60 days after contractor award; monthly thereafter
DRD 26-18-15	License Model Findings and Recommendation Report	60 days after contractor award; monthly thereafter
DRD 26-18-16	License Management Risk Management SOP	30 days after contract award; updates quarterly
DRD 26-18-17	License Model Findings and Recommendation Report	60 days after contractor award; monthly thereafter

Metric #	Description	Metric
Metric 26-18-2-1	The contractor shall maintain 100% accuracy of version management data	Contractor meets this requirement 100% of the time
Metric 26-18-2-2	The contractor shall maintain 100% accuracy of license inventory and related license	Contractor meets this requirement 100% of the time

Metric #	Description	Metric
	and license model management data	

26.19 Asset Management (for Applications, Websites, Web Services, and IT Systems)

Asset management for applications, websites, web services, and IT Systems is critical for IT Management processes such as portfolio management, investment management, EA, systems engineering, strategic and tactical plans. The contractor shall perform asset management of applications, software, tools, websites, web services, and IT systems. To support and execute asset management of applications, software, tools, websites, web services, and IT systems, the contractor shall do activities such as, but not limited to:

- Develop SOPs for asset management
- Develop processes for asset management
- Define roles and responsibilities for the maintenance, execution, and management of asset management for application and web services, websites, and IT systems;
- Manage, maintain, and support an asset management system for applications, websites, web services, IT systems and related assets
- Assess the effectiveness of asset management and develop improvement plans for deficiencies and gaps
- Define, implement, manage, maintain, and execute governance for asset management

DRD	Description	Frequency
DRD 26-19-1	Web Service Inventory	30 days after contract award; monthly thereafter
DRD 26-19-2	Application Inventory	30 days after contract award; monthly thereafter
DRD 26-19-3	Website Inventory	30 days after contract award; monthly thereafter
DRD 26-19-4	System Inventory	30 days after contract award; monthly thereafter
DRD 26-19-5	Asset Management SOP for Applications, Websites, Web Services, and IT Systems	30 days after contract award
DRD 26-19-6	Asset Management Processes for Applications, Websites, Web Services, and IT Systems	30 days after contract award; updates quarterly
DRD 26-19-7	RACI for Application, Website, Web Service, and IT System Asset Management	30 days after contract award; updates quarterly
DRD 26-19-8	Web Service Inventory Error Report	30 days after contract award; monthly thereafter
DRD 26-19-9	Application Inventory Error Report	30 days after contract award; monthly thereafter

DRD	Description	Frequency
DRD 26-19-10	Website Inventory Error Report	30 days after contract award; monthly thereafter
DRD 26-19-11	System Inventory Error Report	30 days after contract award; monthly thereafter
DRD 26-19-12	Asset Management Improvement Plan	30 days after contractor award; quarterly thereafter

Metric #	Description	Metric
Metric 26-19-1	The contractor shall maintain 100% accuracy of application, website, web service, and IT system inventory data	The contractor shall maintain application, website, web service, and IT system inventory with 98% accuracy

26.20 Requirements Development (Engineering) and Management

The intent of requirements development or requirements engineering is to describe the problem that shall be addressed with a technical solution and to define customer needs and what functions, capabilities, features, and constraints shall be addressed in the technical solution. Requirements development and engineering provides the foundation from which design and construction of software, applications, tools, websites, systems, web services, technology, and other technical solutions can be accomplished.

The contractor shall perform requirements development, requirements engineering, and requirements management across all services and support areas related to, integrated with, and/or dependent upon application development/implementation/configuration, system development/implementation/configuration, web service development/implementation/configuration, website development/implementation/configuration, and business architecture.

The contractor shall demonstrate expertise in requirements development/engineering and management methodologies and related activities such as but not limited to: Agile (use story development, epic development, etc), requirements specification, use cases, user scenarios, activity diagrams, swim lane diagrams, state diagrams, traceability matrix, etc. as applicable for the problem and technical solution to be addressed and as applicable to the software development methodology used for development and implementation of a technical solution. The contractor shall model requirements to ensure clear understanding between stakeholder and development teams.

The contractor shall maintain and enhance requirements management, modeling, tracking, and traceability tools and software utilized for requirements development (engineering) and management for all HQ ITCD developed, configured, supported, hosted, managed, and maintained software, products, COTS, tools, applications, O/S, technology, systems, etc. The contractor shall use HQ ITCD's requirement management, tracking, and traceability tools and software.

The contractor shall maintain and manage attributes related to requirements to ensure accuracy in the dispositioning, traceability, prioritization, and implementation of requirements. The contractor shall review attributes quarterly to ensure awareness of new or obsolete attributes and to vet these with HQ ITCD through governance. The contractor shall do the following (such as):

- a. Collect, interpret, model, generate, and document business, functional, and technical requirements in accordance with programmatic mandatory, preferred and optional formats
- b. Provide a consultative role to fully elicit customer requirements
- c. Ensure requirements traceability
- d. Obtain NASA approval of the documented application requirements
- e. Leverage technology, models, diagrams, and multimedia to communicate concepts and details
- f. Schedule and conduct requirements reviews to document and validate the NASA requirements

26.21 Software Development and Technical Development Lifecycle Methodologies

Since HQ ITCD supports a variety of offices, stakeholders and Mission Directorates, flexibility and adaptability with regards to how business and technical needs are addressed is essential. Therefore, no singular lifecycle or software development methodology shall be suitable for development and delivery of all business and technical solutions. The contractor shall be experienced in the execution and performance of work in a variety of software development processes and lifecycles such as but not limited to agile, incremental, rapid application development (RAD), waterfall, prototyping, COTS configuration, etc. The contract shall assist HQ ITCD with refining SDLC and related frameworks, methodologies, processes, etc. as requested and approved by HQ ITCD to ensure relevance and validity with consideration to other requirements outlined in the PWS/contract, industry standards, etc.

HQ ITCD has implemented and is executing over 50% of its software and system development utilizing the agile methodology. This percentage is expected to increase as legacy systems are either modernized, retired, and/or consolidated.

The contractor shall develop and deliver artifacts related to software and system development according to HQ ITCD's Project Management framework, ITCD's Systems Engineering Framework, and software and system development lifecycle requirements. The contractor shall ensure that all required deliverables are developed, generated, uploaded, etc. utilizing HQ ITCD approved templates, tools, software, systems, etc.

26.22 Estimation

Estimation is critical to decision making for investment management, resource management, IT management, project management, portfolio management, procurements, and cost management. The contractor shall perform estimation based on a proven and established framework and model. Therefore, it is essential that the estimation framework, estimation model, estimation SOP and processes address guidance for estimation for a task order, service, program, project, development lifecycle (such as agile, waterfall, iterative, RAD, etc.), work request/service request/change request, and other functional, technical, and programmatic areas supported by this contract. The contractor shall provide this estimation framework, estimation model, estimation SOP, and estimation processes 2 days after contract award. In order for the delivery to be determined as on-time and complete, the estimation framework and model must not require any rework based on government feedback. Estimation framework and model must be accompanied by a reference document that provides the standards, best practices, definitions, algorithms, and other sources by which estimation, the estimation framework, and the estimation model are based, executed, and managed.

The contractor shall provide estimates for all work performed on the contract related application, software, product, website, web service, mobile application, and system development. Estimates shall be stored in the government's systems.

DRD	Description	Frequency
DRD 26-22-1	Estimation Framework	2 days after contract award; updates quarterly
DRD 26-22-2	Estimation SOP and processes	2 days after contract award; updates quarterly
DRD 26-22-3	Estimation Reference Document	2 days after contract award; updates quarterly
DRD 26-22-4	Estimation Model	2 days after contract award; updates quarterly

Service Level Agreement #	Description	SLA
SLA 26-22-1	Accuracy, relevance, and validity of estimates	The contractor shall provide estimates that meet HQ ITCD justification requirements and the estimation calculations and processes approved by HQ ITCD.

26.23 Application, Software, Web Service, and IT System Analysis

To facilitate NASA HQ's management of the Application and Software, Website, Web Service, and IT System Development Program, the contractor shall provide a monthly summary of development activities, including newly identified risks, recommended mitigations, and analysis results for management of technology, risk, cost, architecture, and quality. The contractor shall analyze

applications, software, web services, and IT systems across NASA production environments to do the following (but not limited to):

- a. Determine, identify, and address security risks and vulnerabilities
- b. Identify and address architecture changes needed to support data management, technology management, performance, transactional and processing related capabilities, scalability, and integration
- c. Identify, determine, and address technology changes required to modernize and improve applications, software, web services, and IT systems
- d. Determine candidate applications, software, web services, and IT systems for archival, retirement, and consolidation

The contractor shall collect and report metrics and statistics for applications, software, web services, and systems (specified by HQ ITCD and/or identified as a potential risk or targeted for consideration by the contractor) such as (but not limited to):

- a. Number of users
- b. Peak times of use
- c. Frequency of use
- d. Performance during peak times of use
- e. Technical obsolescence
- f. Security risks and vulnerabilities
- g. Production defects
- h. Number of enhancements requested
- i. Cost of maintenance
- j. Total cost of ownership (TCO)
- k. Code review findings

DRD	Description	Frequency
DRD 26-23-1	Application and Software Analysis Report	Due 30 days after contract award; monthly thereafter
DRD 26-23-2	Application and Software Metrics and Stats Report	Due 30 days after contract award; monthly thereafter
DRD 26-23-3	Application and Software Mitigation Plan	Due 30 days after contract award; updates ongoing
DRD 26-23-4	Web Service Analysis Report	Due 30 days after contract award; monthly thereafter
DRD 26-23-5	Web Service Software Metrics and Stats Report	Due 30 days after contract award; monthly thereafter
DRD 26-23-6	Web Service Mitigation Plan	Due 30 days after contract award; updates ongoing
DRD 26-23-7	IT System Analysis Report	Due 30 days after contract award; monthly thereafter

DRD	Description	Frequency
DRD 26-23-8	IT System Software Metrics and Stats Report	Due 30 days after contract award; monthly thereafter
DRD 26-23-9	IT System Mitigation Plan	Due 30 days after contract award; updates ongoing
DRD 26-23-10	Monthly Application, Web Service, and IT System Audit	Monthly
DRD 26-23-11	Initial Application, Web Service, and IT System Audit Report	Due 90 days after contract award
DRD 26-23-12	Application, Web Service, and IT System Audit SOP and related processes	Due 30 days after contract award; updates quarterly

The contractor shall store the Analysis Reports, Metrics and Stats Reports, and Mitigation Plans in the government system. The data collected on applications, software, and IT systems shall be acquired from monitoring tools, analytics, code reviews, audits, analysis, etc. performed by technical SMEs competent in code analysis, system analysis, utilization of monitoring tools, analytics tools, standards and industry code constructs, and system integration.

The contractor shall perform monthly audits of applications, web services, and IT systems. The initial audit shall be comprehensive and shall require an in-depth analysis of applications, web services, and IT systems. The audit findings for the initial audit shall be delivered to the government in the form of an Initial Application, Web Service, and IT System Audit Report. However, subsequent findings from monthly audits shall be included in the Application and Software Analysis Report, Web Service Analysis Report, and the IT System Analysis Report deliverables. The contractor shall conduct monthly audits based on a subset of applications, web services, and IT systems. The contractor shall define, develop, implement, manage, maintain, and execute an audit SOP and related processes. Criteria for determining the subset of applications, web services, and IT systems that are audited monthly (after the initial comprehensive audit) shall be defined in the audit SOP and must be approved by the government. The SOP shall include guidance on how analysis shall be performed, standards that shall be referenced, how findings shall be determined and scored, etc.

The contractor shall store audit related artifacts and deliverables in the government's systems. The contractor shall store analysis related artifacts and deliverables in the government's systems.

26.24 Website Analysis

The contractor shall analyze websites across NASA production environments to do the following (but not limited to):

- Determine, identify, and address security risks and vulnerabilities
- Identify and address architecture changes needed to support performance requirements
- Identify and address style and format changes needed in response to user navigation patterns

- d. Identify, determine, and address technology changes required to modernize websites and website design

The contractor shall collect and report the following metrics and statistics for websites:

- a. Number of users accessing the website
- b. Peak times of website use
- c. Performance of website during peak times of use
- d. Security risks and vulnerabilities
- e. User navigation patterns
- f. Websites with low or infrequent use

The contractor shall assist HQ ITCD with ongoing definition of new metrics and statistics to be collected and reported on websites.

DRD	Description	Frequency
DRD 26-24-1	Website Analysis Report	Due 30 days after contract award; monthly thereafter
DRD 26-24-2	Website Metrics and Stats Report	Due 30 days after contract award; monthly thereafter
DRD 26-24-3	Website Mitigation Plan	Due 30 days after contract award; updates ongoing
DRD 26-24-4	Monthly Website Audit	Monthly
DRD 26-24-5	Initial Website Audit Report	Due 90 days after contract award
DRD 26-24-6	Website Audit SOP and related processes	Due 30 days after contract award; updates quarterly

The contractor shall perform monthly audits of websites. The initial audit shall be comprehensive and shall require an in-depth analysis of all websites. The audit findings for the initial audit shall be delivered to the government in the form of an Initial Website Audit Report. However, subsequent findings from monthly audits shall be included in the Website Analysis Report deliverables. The contractor shall conduct monthly audits based on a subset of websites. The contractor shall define, develop, implement, manage, maintain, and execute an audit SOP and related processes for websites. Criteria for determining the subset of websites that are audited monthly (after the initial comprehensive audit) shall be defined in the audit SOP and must be approved by the government. The SOP shall include guidance on how analysis shall be performed, standards that shall be referenced, how findings shall be determined and scored, etc.

The contractor shall store audit related artifacts and deliverables in the government's systems. The contractor shall store analysis related artifacts and deliverables in the government's systems. The contractor shall store the Website Analysis Report, the Website Metrics and Stats Report, and the Website Mitigation Plan in the government system.

26.25 Development Tools

The development environment for Application, Website, and Web Service development is essential for appropriate testing, construction, design, and integration of application modules/components, websites, and web services. The contractor shall identify, evaluate, test, implement and/or utilize development tools with consideration to the technical roadmap, HQ ITCD technology stack and technology stack definition, and technical initiatives identified and approved by the government, enhancements to the infrastructure, data management, continuous integration, security, 508, privacy, and other IT standards, protocols, configurations, regulations, and mandates.

The contractor shall implement and maintain a process and SOP as well as related governance by which the contractor can maintain a development tool library to ensure that development teams are equipped for application, website, and web service development.

DRD	Description	Frequency
DRD 26-25-1	Development Tool Process	Due 15 days after contract award; updates due quarterly
DRD 26-25-2	Development Tool SOP	Due 15 days after contract award; updates due quarterly
DRD 26-25-3	Development Tool Library/Repository	Due 15 days after contract award; updates ongoing
DRD 26-25-3	Development Tool Governance	Due 15 days after contract award; updates semi-annually
DRD 26-25-4	Development Tool Assessment and Audit	Due monthly
DRD 26-25-5	Development Environment Specification Report	Due monthly

26.26 Technology Management and Planning for Applications and Websites

The contractor shall perform a variety of activities such as support IT Management and other disciplines and best practices outlined in this PWS/contract.

26.26.1 Technology Evaluation

The contractor shall conduct Analysis of Alternatives (AoAs), Assessments, and Proof of Validation (Proof of Technology) for the evaluation of technology, software, tools, services, and COTS products to identify candidate solutions for applications, systems, websites, and services. AoAs, Assessments, and PoV/PoT shall be conducted utilizing the ITCD AoAs SOP and framework. Results shall be provided to the government utilizing AoA reporting formats, mechanisms, and templates.

The contractor shall support the refinement, administration, and maintenance of the AoA framework, SOP, templates, and report mechanisms and formats. The contractor shall be equipped with sufficient staff competent in Assessment, AoA, and PoV/PoT execution.

Through this support and related services provided by the contractor, the contractor shall demonstrate capability and competence to comply with the following SLAs for AoA, Assessments, and PoV/PoT completion. The contractor shall meet the SLAs below.

a. Assessment

Short cycle, cursory analysis of a technology, software, tool, external or internal service, and COTS product for quick evaluation. This activity supports Mission Directorate and HQ offices in the evaluation of a singular technology, software, tool, external or internal service, or COTS product.

Duration of an assessment shall be defined and requested by the government based on the nature of the requirements. However, the baseline Service Level Agreement for an assessment is as follows:

DRD	Description	Frequency
DRD 26-26-1a-1	Assessment Findings, Report and Recommendation	Ongoing

Service Level Agreement #	Description	SLA
SLA 26-26-1a-1	Completion of the Assessment and Delivery of Findings and Recommendation documents for a tool	2 business days
SLA 26-26-1a-2	Completion of the Assessment and Delivery of Findings and Recommendation documents for a specific technology	2 business days
SLA 26-26-1a-3	Completion of the Assessment and Delivery of Findings and Recommendation documents for software	2 business days
SLA 26-26-1a-4	Completion of the Assessment and Delivery of Findings and Recommendation documents for an internal service	5 business days
SLA 26-26-1a-5	Completion of the Assessment and Delivery of Findings and Recommendation documents for an external service	5 business days
SLA 26-26-1a-6	Completion of the Assessment and Delivery of Findings and Recommendation documents for a COTS product	2 business days

b. Proof of Verification (PoV) (also referred to as Proof of Technology (PoT)) and Analysis

Deep-dive analysis, evaluation, testing, configuration, and pilot of a singular external or internal service, technology, software, tool, or COTS product.

Duration of a PoV and PoT shall be defined and requested by the government based on the nature of the requirements. However, the baseline Service Level Agreement for a PoV and PoT is as follows:

DRD	Description	Frequency
DRD 26-26-1b-1	PoV/PoT	Ongoing
DRD 26-26-1b-2	PoV/PoT Findings, Results and Report	Ongoing
DRD 26-26-1b-3	PoV/PoT Recommendation	Ongoing

Service Level Agreement #	Deliverable and Service	SLA
SLA 26-26-1b-1	Completion of the PoV (or PoT) and Delivery of Findings and Recommendation documents for a tool	15 business days
SLA 26-26-1b-2	Completion of the PoV (or PoT) and Delivery of Findings and Recommendation documents for a specific technology	15 business days
SLA 26-26-1b-3	Completion of the PoV (or PoT) and Delivery of Findings and Recommendation documents for software	15 business days
SLA 26-26-1b-4	Completion of the Pov (or PoT) and Delivery of Findings and Recommendation documents for an internal service	15 business days
SLA 26-26-1b-5	Completion of the Pov (or PoT) and Delivery of Findings and Recommendation documents for an external service	15 business days
SLA 26-26-1b-6	Completion of the Pov (or PoT) and Delivery of Findings and Recommendation documents for a COTS product	15 business days

c. Full AoA

Detailed analysis, evaluation, testing, configuration, and comparison of multiple external and internal services, technologies, software, tools, and COTS products. This activity supports the Emerging Technology Program, the TRM maintenance, EA, application (as well system, and website) modernization, and enhancement to services in order to identify solutions meet customer business, data, and technical needs.

Duration of an AoA shall be defined and requested by the government based on the nature of the requirements. However, the baseline Service Level Agreement for a full AoA is as follows:

DRD	Description	Frequency
DRD 26-26-1c-1	AoA Analysis Document	Ongoing
DRD 26-26-1c-2	AoA Findings, Results and Report	Ongoing

DRD	Description	Frequency
DRD 26-26-1c-3	AoA Recommendation	Ongoing

Service Level Agreement #	Deliverable and Service	SLA
SLA 26-26-1c-1	Completion of the AoA and Delivery of Findings and Recommendation documents for a tool decision	15 business days
SLA 26-26-1c-2	Completion of the AoA and Delivery of Findings and Recommendation documents for a technology decision	30 business days
SLA 26-26-1c-3	Completion of the AoA and Delivery of Findings and Recommendation documents for software	30 business days
SLA 26-26-1c-4	Completion of the AoA and Delivery of Findings and Recommendation documents for an internal service	45 business days
SLA 26-26-1c-5	Completion of the AoA and Delivery of Findings and Recommendation documents for an external service	45 business days
SLA 26-26-1c-6	Completion of the AoA and Delivery of Findings and Recommendation documents for a COTS product	30 business days

The contractor shall ensure that Quality Assurance standards, data accuracy, and evaluation requirements for Assessments, PoV/PoTs, and AoAs are met, validated, and verified within SLAs defined. Therefore, it is required that with no rework of Assessments, PoVs/PoTs, and AoAs shall be done after completion of and delivery of AoA, PoV/PoT, and Assessment, otherwise, the SLAs defined shall not be met.

The contractor shall provide and store Assessment, PoV/PoT, and AoA related deliverables and documentation in the government's system to ensure traceability and management of artifacts.

26.26.2 Trade Studies

A trade study, as defined by ITCD, is an evaluation design options or alternatives for a specific component or module for a service, system, application, or technical capability. The contractor shall conduct trade studies as needed to ensure thoughtful consideration to design and architecture in support of decision making. The contractor shall conduct trade studies as needed and/or requested. Trade studies shall be conducted according to ITCD's (1) AoA SOP and framework guidelines, (2) Systems Engineering Methodology, and industry best practices. Trade studies can be conducted whenever a design decision needs to be made. Therefore, the contractor shall be required to conduct trade studies within a sprint, between sprints, prior to a sprint or release cycle.

Duration of a trade study shall be defined and requested by the government based on the nature of the requirements. However, the baseline Service Level Agreement for a trade study is as follows:

Service Level Agreement #	Description	SLA
SLA 26-26-2-1	Completion of trade study and Delivery of Findings and Recommendation documents for a design decision	3 business days

DRD	Description	Frequency
DRD 26-26-2-1	Trade Study Findings, Results and Report	Ongoing
DRD 26-26-2-2	Trade Study Recommendation	Ongoing

The contractor shall ensure that Quality Assurance standards, data accuracy, and evaluation requirements for trade studies are met, validated, and verified within SLAs defined. Therefore, it is required that no rework of trade studies shall be done after completion of and delivery of a trade study, otherwise, the SLA defined shall not be met.

The contractor shall provide and store trade study related deliverables and documentation in the government's system to ensure traceability and management of artifacts.

26.26.3 Feasibility Studies

A feasibility study, as defined by ITCD, is assessment and analysis on service strategy, service design, service enhancement, and service retirement. Therefore, feasibility studies shall be conducted by the contractor to support decisions that ITCD shall make with regards to service demand versus service capacity, new service development, and service augmentation under the Application and Website Development and Web Services service domains.

The contractor shall define, develop, implement, maintain, and execute a feasibility SOP and process related documents. The SOP and process documents must align and integrate successfully with ITCD's ITIL framework.

DRD	Description	Frequency
DRD 26-26-3-1	Feasibility Study Plan and Schedule	Ongoing
DRD 26-26-3-2	Feasibility Study Status Report	Ongoing
DRD 26-26-3-3	Feasibility Study Findings, Results and Report	Ongoing
DRD 26-26-3-4	Feasibility Study Recommendation	Ongoing

26.26.4 Technology Planning and Management

The planning for and management of technology is critical for successful portfolio and investment management and for overall IT Management. The contractor shall support the strategic and tactical goals of ITCD, HQ, and NASA through the continuous review, analysis, testing, monitoring, and technology evaluation. Therefore, the contractor shall develop strategic and tactical plans for each application, website, web service, software, and IT system developed, maintained, and supported. The strategic and tactical plans developed by the contractor shall support the maintenance and management of HQ EA (data, infrastructure, technical, and business architectures), the Technical Reference Model, the Emerging Technology Program, and sustainment plans for the applications/software, IT systems, web services, etc.

26.26.4.1 Application Roadmaps

The contractor shall develop, deliver, and manage strategic and tactical plans for applications. Strategic and tactical plans shall be reviewed and updated semi-annually. Execution of tactical plans for applications shall be dependent upon user needs, funding, technology constraints, business and operational impacts, infrastructure requirements, and governance.

26.26.4.2 Mobile Application Roadmaps

The contractor shall develop, deliver, and manage strategic and tactical plans for mobile applications. Strategic and tactical plans shall be reviewed and updated annually. Execution of tactical plans for mobile applications shall be dependent upon user needs, funding, technology constraints, business and operational impacts, infrastructure requirements, and governance.

26.26.4.3 Website Roadmaps

The contractor shall develop, deliver, and manage strategic and tactical plans for applications. Strategic and tactical plans shall be reviewed and updated semi-annually. Execution of tactical plans for mobile applications shall be dependent upon user needs, funding, technology constraints, business and operational impacts, infrastructure requirements, and governance.

26.26.4.4 Assessment of Current Technologies

The contractor shall conduct regular assessment of technologies currently used for, in, and by the HQ environment (infrastructure, applications, software, websites, web services, IT systems, etc.). A framework, SOP, related processes, and reporting mechanisms shall be defined, developed, implemented, managed, and/or maintained by the contractor for the assessment of current technologies.

26.26.4.5 Technical Reference Model Support

The contractor shall:

- a. Ensure that the inputs, staff/actors, and controls are identified and defined appropriately in support of TRM SOPs and related change management for ITCD;

- b. Ensure that the inputs, staff/actors, and controls are identified and defined appropriately in support of ITCD's TRM validation, evaluation, analysis, maintenance, and management; the TRM and TRM framework, processes, and related activities;
- c. Identify the inputs required for the TRM, framework, processes, and related activities;
- d. Identify the outputs required for the TRM, framework, processes, and related activities;
- e. Identify the enablers (ITCD staff, contractor staff, tools, etc.) required to support the TRM, framework, processes, and related activities;
- f. Identify the controls that should be implemented for proper maintenance and integrity of the TRM, framework, processes, and related activities;
- g. Identify a governance process in support of the TRM and for investigating upcoming changes in products, planned upgrades, configuration changes, etc. for products currently used and/or targeted in the TRM;
- h. Define metrics/measures (programmatic level; tied to the strategic plan, tactical, etc.) for TRM validation, evaluation, analysis, maintenance, and management for continuous improvement;
- i. Document the roles and responsibilities responsible and accountable for the TRM, framework, management, SOP, and processes;
- j. Define, develop, implement, manage, maintain, and execute a change management process for the TRM;
- k. Ensure TRM change management complies with ITCD's Architecture Review Board (ARB) and CTO governance;
- l. Implement tools, system, and other related automation to support the maintenance, management, and governance of the TRM;
- m. Ensure integration of the TRM, framework, SOP, processes, and governance with CTO authoritative mechanisms, the Systems Engineering methodology and framework, portfolio management and the Investment Review Board (IRB), and other technical, programmatic, and IT management constructs.

26.26.4.6 Sustainment Planning

The contractor shall develop a sustainment plan for applications, systems, websites, and web services. Sustainment plans shall address the following:

- Sustainment activities (such as but not limited to):
 - Configuration management
 - Change management
 - Data management
 - Training
 - Security

- Maintenance
- Baseline management
- Documentation
- Operations
- Deployment
- Help desk
- Technology management (includes obsolescence, technology refreshes, COTS management, etc.)
- Software modifications and updates
- Supply and acquisition management
- Sustainment Criteria (required for applications (software), websites, systems, and web services to enter sustainment operations and planning (such as but not limited to):
 - Source of Repair Assignment Process (SOARP) for outlining responsibility for sustainment
 - Verification and validation of operational status
 - Stable production baseline
 - Complete and current system, application (and software), website, and web service documentation
 - Authority to Operate (ATO)
 - Current and negotiated sustainment transition plan
 - Sustainment staffing and transition plan

The contractor shall conduct an evaluation of websites, web services, applications (including software), and systems to determine if sustainment criteria are met. The contractor shall provide a report with findings for each website, web service, application (including software), and system. Upon government approval, the contractor shall (1) develop sustainment plans for websites, web services, applications (including software), and systems, and (2) implement, maintain, and execute approved sustainment plans.

The contractor shall develop mitigation plans for each website, web service, application (including software), and system for which sustainment criteria is not met. The contractor shall execute and implement mitigations so that sustainment plans can be developed, maintained, and executed for the remaining websites, web services, applications (including software), and systems in HQ ITCD's portfolio/inventory.

Sustainment planning, execution, maintenance, and management shall be ongoing. The contractor shall demonstrate ability to maintain, manage, and execute sustainment plans for websites, web services, applications (including software), and systems. Sustainment plans must reference and address requirements such as quality assurance, quality control, change and configuration management, etc.

The contractor shall provide a monthly report containing status of sustainment activities across all websites, web services, applications (including software), and systems.

The following are deliverables for section 26.26.4 and its subsections.

DRD	Description	Frequency
DRD 26-26-4-1	Sustainment Criteria Report	60 days upon contract award for websites, systems, applications (including software), and web services
DRD 26-26-4-2	Sustainment Plan (for applications, websites, web services, systems)	Initial sustainment plans due within 90 days of contract award for websites, systems, and applications (including software) Sustainment plans shall be updated every 6 months
DRD 26-26-4-3	Sustainment Mitigation Plan	90 days upon contractor award for all websites, web services, applications (including software), and systems not meeting sustainment readiness criteria
DRD 26-26-4-4	Sustainment Status Report	Monthly
DRD 26-26-4-5	Current Technology Assessment Report (for applications, websites, web services, web applications, mobile applications, software, products, systems, etc.)	Quarterly
DRD 26-26-4-6	Roadmaps (for applications, websites, web services, web applications, mobile applications, software, products, systems, etc.)	Quarterly
DRD 26-26-4-7	Technology Evaluation Findings and Recommendation Report	Ongoing

26.27 Data Management

Data management is the development and execution of architectures, data policies and practices, data procedures for management of an information lifecycle for an organization or enterprise. Data management requires mature administration of how data is defined, acquired, evaluated, dispositioned, validated, stored, processed, protected, and transmitted to ensure that business and technical needs are met and are compliant with accessibility, reliability, integrity, and accuracy standards and requirements. The contractor shall perform data management across all technical

platforms and architectures, applications, websites, systems, and services, and shall establish governance from which data management shall be controlled and vetted.

Data storage, retrieval and warehousing shall require a strategy beyond traditional warehousing and shall require a capability for data source management, integration and interface management, link management, service relationship management, registration services, metadata management, data model management, data dictionary management, data and service exchange management and linkages to monitoring and management controls for capacity planning, information usage and data and service exchange.

The Contractor shall provide the data management services and support (to include but not be limited to the following):

- a. Define, develop, establish, maintain, and manage a Data Management Framework
- b. Define, develop, establish, maintain, manage, and execute a Data Management Plan
- c. Define, establish, perform, and support data management governance
- d. Comply with industry standards and best practices for data management
- e. Comply with NASA and ITCD standards and best practices for data management
- f. Restrict and otherwise minimize point-to-point service and data exchanges while promoting service advertisement, utilization, and management
- g. Data Exchange Agreements (DEA) shall be migrated to fully automated service advertisements in order to maximize reuse of software functions and minimize point-to-point data exchanges
- h. Automate DEAs sufficiently so that monitoring of success, schedule, and availability for more capacity can be determined
- i. Ensure that vocabularies including data dictionaries, and metadata, and portfolio attributes are shared and used by a HQ search and query service
- j. Provision capabilities to add metadata elements of provenance and similar data validation and quality verification
- k. Provision mechanisms to ingest data dictionaries, metadata, and similar sources in to search indexes and query builders;
- l. Emphasize maximum flexibility in the use of customer facing interfaces that enable self-service (e.g. query services, mashups);
- m. Identify, configure, implement, integrate, utilize, maintain, support, and manage data management tools; and
- n. Support ITCD's data architecture and ITCD, HQ, and NASA data models.

DRD	Description	Frequency
DRD 26-27-1	Data Management Plan	Due 90 days after contract award; updates due quarterly

DRD	Description	Frequency
DRD 26-27-2	Data Management Framework	Due 90 days after contract award; updates due quarterly
DRD 26-27-3	Data Management Model	Due 90 days after contract award; updates ongoing
DRD 26-27-4	Data Management Governance Model	Due 90 days after contract award; updates semi-annually
DRD 26-27-5	Data Management Governance Charter	Due 90 days after contract award; updates upon request or as required pending ITCD's governance model
DRD 26-27-6	Data Management Governance Board	To be established 90 days after contract award and after governance charter approval
DRD 26-27-7	Data Management Administration Process	Due 90 days after contract award
DRD 26-27-8	Data Management Standards and Best Practices Library	Due 30 days after contract award; quarterly updates thereafter
DRD 26-27-9	Data Management Audit Report	Monthly
DRD 26-27-10	Data Management Improvement Plan	Quarterly
DRD 26-27-11	Data Exchange Agreements	Ongoing per Data Management Plan and Application & Website Development Lifecycle requirements/processes

27.0 Systems Engineering & Implementation Services and Support Requirements

The NASA HQ ITCD Systems Engineering and Implementation services and support provide the architecture, design, and technology specifications for technical solutions to be implemented and/or enhanced. The Contractor shall provide Systems Engineering and Implementation services and support for NASA HQ ITCD as well as under the IDIQ portion of this contract.

27.1 Systems Engineering Maturity and Capabilities

The contractor shall provide both written and past customer-based referential proof of the ability to perform Systems Engineering at an Acceptable level of maturity.

The contractor shall provide proof of maturity in systems and software development by providing to the government written proof of attaining and maintaining Capability Maturity Model Integration (CMMI) level 3 or above in the following core process areas:

- Development
- Services

27.1.1 Systems Engineering Management Plan

The contractor shall submit a Systems Engineering Management Plan (SEMP) in a format consistent with NASA NPR 7123.1B Appendix D Systems Engineering Management Plan. The SEMP shall provide a complete and thorough description of the contractor's proposed systems engineering methodology, processes and applicable standard operating procedures (SOPs).

27.2 Technical Performance Measures (TPM)

TPMs shall be used to monitor and assess the technical maturity of developed systems throughout their development cycle. The contractor shall identify the TPMs it intends to use to track technical performance, proactively identify potential technical problems and track the effectiveness of corrective actions and risk mitigations. The set of TPMs shall include metrics for system key performance parameters (KPPs), along with other important parameters as appropriate.

27.3 Risk Management

The contractor shall implement a comprehensive risk management process that is focused on system risk areas and critical path(s) to systematically identify and mitigate cost, schedule, and technical risks. Ensure contractor risk management processes are compatible with the NASA risk management process and provides for timely government insight.

27.4 Technical Reviews

The contractor shall propose technical reviews required to manage system engineering development activities. The technical reviews to be accomplished during a system development activity include the following:

27.4.1 System Requirements Review (SRR)

The SRR shall be a multi-disciplined technical review convened by the contractor for the formal review of the System Requirements and the contractor's system solution. The data presented in the review shall provide evidence that the contractor's system solution (including both hardware and software, as applicable) is viable and consistent with the system requirements.

27.4.2 Preliminary Design Review (PDR)

The PDR shall be a multi-disciplined technical review convened by the contractor, subsequent to the SRR and the decomposition of the system's functional definition, to determine whether the

hardware and software preliminary designs are satisfactorily complete, and the system is ready to move into detailed design.

27.4.3 Critical Design Review (CDR)

The CDR shall be a multi-disciplined technical review convened by the contractor for the formal review of the product's detailed design. Completion of the CDR confirms that the design is ready for the commencement of formal system integration and end to end functional testing.

27.4.4 Test Readiness Review (TRR)

The TRR is a multi-disciplined technical review convened by the contractor to assess the readiness of the system or its subsystems to proceed into formal testing.

27.4.5 Production Readiness Review (PRR)

The PRR shall be a series of multi-disciplined reviews convened by the contractor to verify that the system requirements are fully met in the final production configuration.

27.4.6 Other Technical Reviews

Other technical reviews may be proposed as needed, depending on the scope of the systems engineering effort, and may include peer reviews, Technical Exchange Meetings (TEM), Structured Walkthroughs (SWTs) Architectural Review Board (ARB), Program Management Review Board (PMRB) and Interface Control Working Group (ICWG) meetings, etc.

27.5 Configuration Management

The contractor shall develop, maintain, and document a configuration management plan and supporting processes and SOPs. The plan, processes, and SOPs shall address configuration identification, status accounting, configuration control and reviews and audits. The contractor shall address hardware and software of the system as well as the test equipment and test items. The contractor shall retain all configuration data and provide government access to the data repository.

27.6 Requirements Management

The contractor shall propose a disciplined control process for the development of requirements for the product and its subcomponents. The process shall include methodologies for the solicitation and decomposition of requirements provided by the customer into system requirements for the product, and shall include the development of a functional architecture for the system, based on the system requirements.

27.6.1 Requirements Traceability

The contractor shall propose a requirements traceability methodology that documents and retains details of the relationships between requirements at all levels and phases of the SELC, as well as the relationships between the requirements and the product's hardware and software architectures and implementations.

27.6.2 Requirements Database

The methodology shall be bi-directional, and a relational database (e.g., Dynamic Object Oriented Requirements System (DOORS Next Gen), Rational Requirements Composer (RRC) or a similar tool) shall be included in the methodology. The methodology proposed shall also support the identification of disconnects (or errors) in the bi-directional requirements flow, as well as sufficient data from underlying analyses to permit scrutiny of the analyses.

27.7 Hardware Design

The contractor shall propose an effective hardware design process that promotes affordability and agile initiatives at the start of the design cycle, and assures participation of all program functions in the development of a product design that is producible, reliable, supportable, affordable, and that meets the customer's operational and performance requirements, and life cycle and disposal needs.

27.8 Software Development/Implementation

The contractor shall provide software implementation support services as described within section 26 of this PWS.

27.8.1 Development of Software Design Requirements

A documented process shall be employed for the development of software design requirements. The design requirements shall be directly traceable to the system performance requirements. Methodologies used shall be identified and shall include analyses, trade studies and simulations as appropriate for the level of complexity and risk associated with the system. The software requirements shall be documented and placed under configuration control for reference.

27.8.2 Software Code and Unit Test

The contractor shall propose a controlled process for the development of software code and unit tests.

27.8.2.1 Software development tools

Tools used in the software development process shall be defined, along with configuration control tools and methodologies.

27.8.2.2 Traceability

The source code developed shall be consistent with and traceable to the detailed design.

27.8.2.3 Peer reviews

The process shall include peer reviews during the code development process.

27.8.2.4 Unit testing

Unit test cases shall be developed, and the results of the unit tests shall be documented.

27.8.2.5 Configuration Control

The final source code configuration, including modifications made during the unit test process shall be placed under configuration control.

27.8.2.6 Software test Plan

A software test plan reflective of the controlled source code configuration shall be developed and also placed under configuration control.

27.8.3 Software Design Methodology

The contractor shall propose the methodology whereby top-level design options are evaluated in establishing the product's software architecture design. Analyses, trade studies and simulations are applicable to this activity. Some, but not all, of the parameters pertinent to the evaluation are: performance, testability, use of COTS, maintainability, reuse, and safety.

27.8.4 Software Configuration Item Build, Integration and Test

The contractor shall propose a methodology for the build, integration, and test of software configuration items. Traceability to the software design architecture shall be evident in the process.

27.8.4.1 Defect Identification

Defects found during integration shall be identified, tracked, and appropriate corrective actions developed and tested.

27.8.4.2 Defect Testing

Testing shall verify that all requirements associated with the configuration items are met, and that appropriate corrective actions shall be taken as needed.

27.8.4.3 Defect Testing Documentation

All test results shall be documented and linked to the configuration tested, and the final tested configuration shall be placed under configuration control.

27.8.5 Software Delivery, Transition, and Maintenance

The contractor shall propose a process for the delivery, transition and maintenance of system software. The process shall ensure the following:

- Creation of a deployment/installation plan
- Change control is accounted for and implemented
- Regression testing is accounted for and implemented
- User manuals are created and provided

27.9 Reliability Supportability, and Logistics

The contractor shall propose a methodology for establishing and maturing the reliability and supportability of the product from inception through fielding.

27.10 Studies and evaluations

The contractor shall perform special studies and technology evaluations as requested by the Government to include:

- Feasibility Studies
- Design trade studies
- Product evaluations
- Cost benefit analyses
- Analysis of Alternatives

27.11 Continuous Improvement

The Contractor shall, for each proposed plan, process and procedure, account for the continuous improvement of said processes.

27.12 Quality Assurance

The contractor shall implement a program to provide quality assurance of system engineering, system implementation and software development processes and deliverables.

27.12.1 Quality Assurance Plan

The contractor shall develop and maintain a System Quality Assurance Plan which details the subsystem and system level processes used to ensure both system and software products are tested and validated in accordance with the systems engineering requirements decomposition. Major events within the Software Quality Assurance Plan shall be reflected in a program IMS. Major events include, but are not limited to:

- System and Software Quality Audits
- System and Software Configuration Audits
- System and Software Qualification Testing.

27.12.2 Quality Assurance Inheritance

System and Software Quality Assurance standards and requirements shall be flowed to vendors and subcontractors that produce software products used in meeting system requirements.

27.13 Independent Verification and Validation Support

The contractor shall provide support for the process of Independent Verification and Validation (IV&V) by performing the following:

- Providing needed information as agreed upon and when requested
- Collaborating with the IV&V team through all prescribed phases the system lifecycle

27.14 Remaining current on Systems Engineering Standards and Best Practices

The contractor shall provide a means to ensure that it remains current on current and emerging industry standards best practices for systems engineering.

27.14.1 Provide Information on current and emerging Standards and Best Practices

The contractor shall provide, on a reoccurring basis, via periodic briefings and white papers, information pertaining to emerging systems engineering tools, standards and best practices.

27.15 Establish a Systems Engineering Community of Practice for NASA HQ

The contractor shall establish and actively support a systems engineering Community of Practice (COI) working group for NASA HQ. The contractor shall participate in the NASA Agency wide Systems Engineering COI.

27.16 Implementation (IMP) Requirements

27.16.1 Implementation Support

The contractor shall provide implementation level support for the Systems Engineering Facility (SEF) which encompasses the following environments:

- Development
- Testing
- Staging
- Research and Development

Implementation level support is defined as performing the following activities:

27.16.1.1 Provisioning both physical and virtual machines and related OS platforms for development, testing, staging, research and development and production.

27.16.1.2 Creating CA Single Sign On (Siteminder) profiles for all applications within the SEF and production environments.

27.16.1.3 Performs installation and administration of both COTS and open source applications within the SEF.

27.16.1.4 Maintaining templates of various builds to ensure the rapid provisioning of virtual machines.

27.16.1.5 Maintaining an inventory of SEF assets within the official ITCD repository for the management of technical documentation and assets as well as creating new assets for production when deploying new physical and virtual servers.

27.16.2 Required SE&I Skill Sets Matrix

The skillsets table below represents the required skillsets for SE&I. Attributes for required competencies, minimum required level of experience and recommended level of experience are outlined for each skill set.

Skill	Required Core Competencies	Minimum Required Level of Experience	Recommended Level of Experience
System Architect	<ul style="list-style-type: none"> • Depth in Systems Development • Depth in Technology & Innovation Management • Depth in Software Architecting • Depth in System Integration & test • Depth in Architecture communication 	5+ Years of experience acting as a System Architect for medium and moderate to large and highly complex systems	8+ Years of experience acting as a System Architect for medium and moderate to large and highly complex systems

Skill	Required Core Competencies	Minimum Required Level of Experience	Recommended Level of Experience
	<ul style="list-style-type: none"> • Depth in Modeling System Architecting & Design • Depth in Architecting for system performance • Depth in Architecting for system reliability • Breadth in Established system architecture technologies • Breadth in emerging system architecture technologies • Depth in Knowledge & experience sharing 		
Solutions Architect	<ul style="list-style-type: none"> • Depth in Systems development • Depth in System Architecture & Design • Depth in Software Architecture & Design • Breadth in Established Solution Architecture Technologies • Breadth in Emerging Solution Architecture Technologies 	5+ Years of experience acting as a Solutions Architect for medium and moderate to large and highly complex systems	8+ Years of experience acting as a Solutions Architect for medium and moderate to large and highly complex systems
Data Architect	<ul style="list-style-type: none"> • Depth in Systems development • Depth in Data modeling • Depth in Database Design • Big data Strategies and Implementation • Depth in Data Warehousing • Breadth in Established Data Technologies 	5+ Years of experience acting as a Data Architect for medium and moderate to large and highly complex systems	8+ Years of experience acting as a Data Architect for medium and moderate to large and highly complex systems

Skill	Required Core Competencies	Minimum Required Level of Experience	Recommended Level of Experience
	<ul style="list-style-type: none"> Breadth in Emerging Data Technologies 		

27.16.3 Related SE&I DRDs

The contractor shall provide the DRDs listed within the following table on demand or as listed in the frequency column. A brief description of each DRD is listed below along with its frequency of delivery. These DRDs represent documented plans, processes and standard operating procedures (SOPs) for a number of SE&I related IT practices and are to be used in managing and maintaining both the ITCD SEF and Production instances and environments.

The table below lists deliverables for section 27.16 and its subsections.

DRD	Description	Frequency
DRD 27-16-1	<p>Change Management Plan Procedure</p> <p>This plan describes the procedure for performing change management applicable to ITCD managed systems, applications and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-2	<p>Configuration Management Plan Procedure</p> <p>This plan identifies all things to which configuration management must be applied and defines a baseline of configuration items. It also describes the procedure for performing configuration management on ITCD managed systems and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-3	<p>System Backup Plan & Procedure</p> <p>This plan defines the procedure for backing up system and application data and configuration related content for ITCD managed systems, applications and environments.</p>	30 days after contract award and after which is reviewed and updated annually

DRD	Description	Frequency
DRD 27-16-4	<p>Software and Hardware License Management Plan</p> <p>This plan describes the procedure for managing hardware and software licenses for ITCD procured and managed hardware and software.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-5	<p>Patch Management Plan</p> <p>This plan defines the procedure for patching ITCD managed systems, applications, platforms and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-6	<p>User Management Plan</p> <p>This plan describes how users will be provisioned across systems, applications and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-7	<p>Storage Provisioning Plan</p> <p>This plan describes the procedure for how storage, both physical and virtual, will be provisioned among ITCD managed applications, systems and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-8	<p>Physical/Virtual System Provisioning Plan</p> <p>This plan describes the procedure for documenting and provisioning both physical and virtual systems.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-9	<p>System Monitoring (Individual System) Plan</p> <p>This plan defines the procedures, both automated and manual, for performing monitoring at the system level.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-10	<p>Environment Monitoring (Multiple Systems) Plan</p>	30 days after contract award and after which is reviewed and updated annually

DRD	Description	Frequency
	This plan defines the procedures, both automated and manual, for performing monitoring at the environment level.	
DRD 27-16-11	<p>Incident Management (Response and Mitigation) Plan</p> <p>This plan defines the procedure for performing incident management applicable to ITCD managed systems, applications and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-12	<p>Asset Management (Software and Hardware) Plan</p> <p>This plan defines the baseline inventory of ITCD managed SEF assets. It also defines the procedure for performing asset lifecycle management.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-13	<p>Platform Maintenance Plan</p> <p>This plan defines the procedure for performing platform maintenance for ITCD managed systems, applications and environments.</p>	30 days after contract award and after which is reviewed and updated annually
DRD 27-16-14	<p>Technology/Infrastructure/Platform Upgrade Plan</p> <p>This plan defines the procedure for monitoring the lifecycle of ITCD managed technology and infrastructure. It also defines the procedure for upgrading said technology and infrastructure in addition to identifying the criteria that must be met and/or thresholds that must be reached which will require an upgrade along with any applicable deliverables such as new or updated documentation artifacts.</p>	30 days after contract award and after which is reviewed and updated annually

DRD	Description	Frequency
DRD 27-16-15	<p>IT System Continuity of Operations Plan</p> <p>This plan defines and ranks IT systems, which are detrimental to performing ITCD mission related work. This plan also defines a procedure for performing continuity of operations tasks in the event of a catastrophic failure.</p>	30 days after contract award and after which is reviewed and updated twice annually
DRD 27-16-16	<p>Systems Engineering Management Plan</p> <p>This plan defines the contractors overall systems engineering management approach. It defines and describes, in detail, the overall approach to the application of the contractor's systems engineering standards, processes and procedures, governance and management processes, and any related tool sets to be used in performing systems engineering and implementation projects and efforts.</p>	30 days after contract award and after which is reviewed and updated twice annually
DRD 27-16-17	<p>Systems Engineering Community of Interest charter</p> <p>This charter, when approved, will authorize the establishment of the ITCD SE&I community of interest.</p>	60 days after contract award and after which is reviewed and updated as requested
DRD 27-16-18	<p>Quality Assurance Plan</p> <p>This plan describes the strategy and methods the contractor will utilize to ensure that systems engineering projects are being managed, developed, and deployed in a sound, reasonable way that all of the project's deliverables are of acceptable quality before they are delivered to the government.</p>	30 days after contract award and after which is reviewed and updated twice annually

The following are metrics for section 27 (Systems Engineering and Implementation Services) and its subsections.

Metric #	Description	Metric Areas	Method of Observation
Metric 27-0-1	Percentage of DRDs delivered on time	DRD Deliverables	Calculated as: $100 * \frac{\text{\#of DRDs delivered on time}}{\text{\#of required DRDs} - \text{\#of DRDs not requested}}$ 1. Successful if calculated percentage is more than 95%
Metric 27-0-2	Percentage of DRDs that require re-work after being formally submitted to the Government		Calculated as: $100 * \frac{\text{\#of DRDs that require re-work}}{\text{(total \#of required DRDs required} - \text{\#of DRDs not requested)}}$ 1. Successful if calculated percentage is less than 5%
Metric 27-0-3	Percentage of Failed ITSEM gate reviews	ITSEM Gate Reviews	Calculated as: $100 * \frac{\text{\#of failed SE gate reviews}}{\text{total \# of gate reviews performed}}$ 1. Successful if calculated percentage is less than 5%
Metric 27-0-4	Percentage of Failed SE deliverable reviews	ITSEM Deliverable Reviews	Calculated as: $100 * \frac{\text{\#of failed SE deliverable reviews}}{\text{total \# of deliverable reviews performed}}$ 1. Successful if calculated percentage is less than 5%
Metric 27-0-5	1. The successful implementation and maintenance of Amazon Web Services (AWS) based virtual development, testing, staging and production environments used in support of systems engineering and implementation processes, procedures, services and tasks.	Systems Engineering Core Performance	1. AWS based virtual development, testing, staging and production environments exist and are maintained within the compliance of the NASA Agency and HQ ITCD Technical Reference Matrix (TRM).
Metric 27-0-6	1. The Successful compliance with and use of the ITCD Information Technology Systems Engineering Methodology (ITSEM) processes, procedures and templates.		1. Applicable ITSEM gates are completed with a favorable outcome. 2. All applicable deliverables are accepted by the government at a rate of more than 95%. 3. ITSEM processes and procedures are followed at a rate of more than 95%. 4. A waiver is submitted and approved in all cases where the ITSEM processes and procedures are not followed as outlined.
Metric 27-0-7	1. Required Staffing Applied 2. Appropriate Skills Applied 3. Churn Rate 4. Training Available	SE&I Program Resources	1. Staffed to at least 80% according to plan 2. Ideally churn is less than 5% per quarter
Metric 27-0-8	1. Overall Trend for identified risks	Risk Handling	1. Identified risks come to closure

Metric #	Description	Metric Areas	Method of Observation
	2. Appropriate Priority Applied to identified risks		without significant impact. 2 Less risks are being created over time (- slope) 3 Appropriate resources are assigned to manage identified risks.

28.0 Emerging Technology (ET) Services and Support

Emerging technologies are new technologies that are described as having the ability to substantially alter the way an organization does business.

28.1 Emerging Technology Practice Definition

The contractor shall provide consulting support services to NASA HQ ITCD to assist in establishing, documenting, maintaining, and maturing an Emerging Technologies Program that complies with industry best practices, and NASA policies and procedures.

The contractor shall define a strategy and implementation plan for establishing an emerging technology practice (line of business) for NASA HQ ITCD.

- The strategy and implementation plan shall identify key enablers to establishing an Emerging Technology Practice as an ongoing business capability.
- The strategy shall identify the personnel and financial resources needed to establish and effectively maintain the ET practice.
- The implementation plan shall define both processes and standard operating procedures for the Emerging technology practice.

DRD	Description	Frequency
DRD 28-1-1	Emerging Technology Practice Strategy	Due 60 days after contract award
DRD 28-1-2	Emerging Technology Practice Implementation Plan	Ongoing
DRD 28-1-3	Emerging Technology Practice Resource Management Plan	Due first 60 days after contract award; Quarterly thereafter or more frequently per ITCD request
DRD 28-1-4a	Emerging Technology Framework, SOPs, Processes	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)

DRD	Description	Frequency
DRD 28-1-4b	Emerging Technology Evaluation Criteria and Risk Model	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 28-1-5	Emerging Technology Work Estimation Calculation Methodology	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 28-1-6	Emerging Technology Standards	Due first 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)

28.2 Emerging Technology Practice Research Support

The contractor shall conduct research on emerging trends in technology and new developments that may change the way NASA HQ ITCD conducts business in the future. With this information, NASA HQ ITCD will be better prepared to support the needs of NASA HQ customers in its effort to effectively and efficiently develop requirements, budget for, acquire and deploy these new technologies.

Pertaining to emerging technologies, the contractor shall:

- Provide Emerging Technology practice thought leadership and technical implementation expertise in the design, development, and governance of Service-Oriented Architectures, Web-Oriented Architectures, and Managed Hosting and Cloud Computing Architectures
- Conduct research on changes in technology and emerging trends
- Identify emerging technologies applicable to ITCD's mission and service domains
- Assess the risk associated with the adoption of emerging technologies
- Assess NASA HQ ITCD's ability to adapt to impending changes related to the emerging technology area of impact.
- Assess NASA HQ ITCD's ability to adopt these technologies for use within the NASA environment
- Provide briefings of all research and assessment information to NASA HQ ITCD and stakeholders
- Develop implementation and integration plans for the incorporation of emerging technologies
- Support NASA HQ ITCD in collaborating with other NASA centers and organizations interested in emerging technology research and implementation

DRD	Description	Frequency
DRD 28-2-1	Change Management Plan for Emerging Technology	Due 60 days after contract award

DRD	Description	Frequency
DRD 28-2-2	Implementation Plans for Emerging Technology Adoption	Ongoing
DRD 28-2-3	Integration Plans for Emerging Technology	Ongoing
DRD 28-2-4	Emerging Technology Research and Trend Report	Monthly
DRD 28-2-5	Emerging Technology Test Results Report	Monthly
DRD 28-2-6	Emerging Technology Risk Report	Monthly

Metric #	Description	Metric
Metric 28-2-1	New Technologies, Innovations, and/or Techniques	10 new technologies, innovations, and/or techniques are identified, evaluated/tested, proposed, piloted and/or implemented monthly in accordance with Emerging Technology requirements, standards, governance, framework, processes, etc.

28.3 Emerging Technology Implementation

The contractor shall define and implement the requirements for a cloud-based virtual test bed environment to be used for researching, testing, evaluating and piloting emerging technologies.

Pertaining to emerging technology implementation the contractor shall:

- Document the technical resources needed to effectively support the emerging technology practice.
- Implement the technical resources needed to effectively support the emerging technology practice.
- Manage and maintain all technical resources used in supporting the emerging technology practice.

DRD	Description	Frequency
DRD 28-3-1	Emerging Technology Lessons Learned Report	Monthly
DRD 28-3-2	Emerging Technology Pilot Plan (for each new emerging technology approved for pilot)	Ongoing

DRD	Description	Frequency
DRD 28-3-3	Emerging Technology Pilot Results (for each new emerging technology approved for pilot)	Ongoing

29.0 Multimedia & Web-Streaming

The contractor shall operate and maintain Headquarters Multimedia & Web Streaming services. This support shall include providing media that uses a combination of different content types such as text, audio, images, animation, video and interactive content to meet user communication business requirements. As required by the government, the contractor shall also stream identified content to meet NASA outreach and communications initiatives. When requested, the contractor shall provide support for NASA events that are conducted both on-site and off-site. The contractor shall provide services to digitally capture such events and meetings for the purpose of live Web-streaming, post event Web-streaming, or event recording. As required, the contractor shall also ensure effective delivery of content provided by or to NASA TV for the purpose of streaming to intended audiences.

Multimedia and Streaming support shall include but is not limited to the following:

- a. Ensure proper coordination with public affairs, NASA TV, and others to ensure reliable and timely broadcast of content through the HQ streaming media servers;
- b. Ensure that the HQ streaming servers are maintained and are compliant with correct compression and service requirements of NASA TV and the Agency portal;
- c. Participate in the planning, coordination, setup, recording, and streaming of NASA events;
- d. Provide on location technical staff to record NASA events using provided portable recording and encoding systems for posting to websites, DVD releases, or streaming over the web;
- e. Evaluate new and emerging technologies to continually enhance service offerings associated with the capability to capture and stream NASA events (live and recorded formats);
- f. Develop and deliver products based on government requirements and industry quality standards for format and medium;
- g. Provide the government a Multimedia and Streaming Activity Report providing data on support rendered;
- h. Track customer satisfaction levels for each event supported;
- i. Ensure all files and documents meet 508 compliance requirements;
- j. Posting approved content to websites as identified by the government;
- k. Contractor shall coordinate and collaborate with other NASA Site Curators (Such as Agency Level Teams or Other Organizational Programs).

DRD	Description	Frequency
DRD 29-0-1	Multimedia and Streaming Activity Report <ul style="list-style-type: none"> category of support type of service offered 	30 days from contract start and monthly thereafter

	<ul style="list-style-type: none"> • individual service was rendered to • date rendered and status of activity • follow up actions required and completed • customer satisfaction level 	
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30A.0 Content Management Services

The contractor shall provide content management services and support. Services and support include but are not limited to:

- a. Utilizing, maintaining and/or managing content management systems
- b. Classifying, categorizing, storing, tagging, creating, distributing, and/or managing content
- c. Document management and content management
- d. Utilizing, maintaining and managing document management systems
- e. Translation services (such as graphics and animation services)
- f. Conversion services (such as HTML and XML conversions)
- g. Semantic search capabilities and techniques for indexing, searching, and tracking content across several platforms
- h. Content management strategy development, implementation, and execution
- i. Predictive analytics for determining trends and for gaining user insight and behavior
- j. Utilizing and implementing mobile content management platforms across a variety of devices, technologies, etc.
- k. Providing on-demand analytics in support of content management and its relationship with big data and disparate systems and related information
- l. Updating, managing, and maintaining content on websites
- m. Evaluating, implementing, and maintaining content management tools and products used in support of content management activities and systems
- n. Providing services and support for services associated with ITCD's Content Management Service Domain, Collaboration Services Domain, Software Engineering Service Domain, etc.
- o. Ensuring integration with content management services offered by the agency, HQ, other centers, and other federal agencies
- p. Updating, managing, and maintaining content
- q. Validation and verification of content

A content management strategy shall be developed to ensure that consistency, compliance, and risk management in content handling, processing, management, and maintenance is achieved across the contract. The contractor shall develop, maintain, and manage the content management strategy in accordance with ITCD requirements, NASA, federal, and industry standards and regulations. Therefore, the contractor shall ensure competency in content management, content management systems, content

management strategy, standards, etc. Based on the content management strategy, a framework shall be developed and maintained to ensure consistency in execution of content management services.

DRD	Description	Frequency
DRD 30A-0-1	Content Management System	Due 60 days after contract award; updates quarterly thereafter or more frequently pending government's request
DRD 30A-0-2	Content Management Strategy	Due 60 days after contract award; updates quarterly thereafter or more frequently pending government's request
DRD 30A-0-3a	Content Management Framework	Due 60 days after contract award; updates quarterly thereafter or more frequently pending government's request
DRD 30A-0-3b	Content Management SOP and processes	Due 60 days after contract award; updates quarterly thereafter or more frequently pending government's request
DRD 30A-0-4	Content Management Standards	Due 60 days after contract award; updates quarterly thereafter or more frequently pending government's request
DRD 30A-0-5	Content Management Analysis and Findings Report	Monthly
DRD 30A-0-6	Content Risk Report	Monthly
DRD 30A-0-7	Content Risk Mitigation and Recommendation	Ongoing
DRD 30A-0-8	Validation and Verification of Content	Ongoing
DRD 30A-0-9	Validation and Verification of Content Report	Quarterly

Metric #	Description	Metric
Metric 30A-0-1	Content Verification, Validation, and Content Updates	The contractor shall update content (determined as non-compliant, not valid, not accurate, outdated, of risk concern, etc.) within 1 business day of HQ ITCD approval to do so

30B.0 Document Management Services

HQ uses document management systems to improve staff productivity by enhancing the use of documents and records as a corporate information source. The Contractor shall maintain the HQ document management system, including associated hardware, software systems, tools and technology that is used to support document management and establish standardized processes and configuration packages and quality of service delivery. The Contractor may be asked to recommend and develop new document management systems and capabilities that will be used to track, manage and store documents and capable of keeping a record of the various versions created and modified by different users. The system shall be capable of but not limited to the ability to search documents and folders using full text search, various attributes and document content. The system shall allow documents to be retrieved and worked on by an authorized user, allowing multiple users to view and modify documents at the same time. The system shall provide a unified platform to search and retrieve documents, and easy online document retrieval for stakeholders and employees.

In performance of these services, the contractor shall:

- a. Maintain and enhance the HQ document management system as approved by the Government
- b. Create and manage document management users and groups
- c. Develop and maintain standards and best practices, for document sharing services
- d. Perform maintenance tasks such as data archival, and performance fine-tuning
- e. Develop operational, technical procedures and workflow process
- f. Develop SOPs for the operation and sustainment of the document management service and stored in a government provided system
- g. Perform maintenance activities as defined in the government approved SOPs
- h. Perform system performance studies, capacity analysis and provide recommendations to improve operational efficiency
- i. Monitor services that support the documents management system, database platform for content, DM library, and service utilization
- j. Identify whether information is being managed effectively through monitoring of compliance with document management policies and procedures
- k. Provide troubleshooting of document management issues that include users rights to libraries, archival of documents, integration with other applications and MS Office products

DRD	Description	Frequency
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DRD 30B-0-1	System Availability, system utilization and performance report	Monthly, or more frequently pending government's request
DRD 30B-0-2	Document Management Capacity Planning Report	Monthly, or more frequently pending government's request
DRD 30B-0-3	Documentation support in the form of technical system documentation, user guides, and SOPs	Ongoing

Metric #	Description	Metric
Metric 30B-0-1	System Availability	> 99.95% Measurement: Monthly

31.0 Form Development Services and Support

The contractor shall provide services for the design, development, publication, and maintenance of NASA agency and NASA HQ forms in electronic format using the agency approved solution for electronic forms Adobe Live Cycle.

The contractor shall ensure that all solutions and services provided pertaining to electronic forms development meets NASA Agency and NASA HQ ITCD policies, standards, and procedures for development, information assurance and 508 accessibility. (e.g. information assurance, and 508 compliance). The contractor shall work with HQ and Agency forms managers to ensure that all forms requirements and forms management requirements are addressed. The contractor shall develop, implement, and maintain a reporting solution for NASA Agency and HQ forms that complements and supports Adobe Live Cycle.

Solutions designed, developed, published, and maintained by the contractor shall be stored in a repository for proper configuration control and configuration management. Forms designed, developed, published, and maintained by the contractor shall comply with standards, regulations, processes, policies, and other guidance applicable on and to this contract to ensure alignment other technical services and support required in this Performance Work Statement (PWS).

The contractor shall provide written estimates of work pertaining to the development of Adobe Live Cycle electronic forms. Additionally, the contractor shall define estimation methodology and calculations for written estimates provided for the development, maintenance, and enhancement of Adobe Live Cycle electronic forms. Estimates provided for the development, maintenance, and enhancement of Adobe Live Cycle forms shall have justification and description of estimates to ensure clear communication across ITCD, contractor support team members, and customers. The contractor shall ensure that contractor staff is proficient in Adobe Live Cycle and other current and future technology supporting the development of HQ and Agency forms.

The contractor shall participate in weekly work prioritization meetings with the NASA Agency electronic forms manager and NASA HQ Center forms manager. The contractor shall establish a

communications plan for HQ and Agency Forms Development and Management to ensure timely, structured, appropriate, and accurate delivery of status, risk, forms development information, etc.

The contractor shall define a configuration management process, a change management process, SOPs, and other related artifacts and processes such as change management, governance, release management, software development lifecycle (and software engineering), project management, systems engineering, , ITIL, testing, information security, and portfolio management, for forms development.

DRD	Description	Frequency
DRD 31-0-1	Technical Solution for Adobe Live Cycle Reporting	Due 60 days after contract award
DRD 31-0-2	Adobe Live Cycle Reporting Maintenance Roadmap	Due 60 days after contract award; Quarterly thereafter or more frequently per ITCD request
DRD 31-0-3	Configuration Management Plan for Forms Development	Due 60 days after contract award; Quarterly thereafter or more frequently per ITCD request
DRD 31-0-4a	Change Management Plan for Forms Development	Due 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 31-0-4b	Forms Estimation Methodology and Calculations	Due 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 31-0-5	Work Estimates for New and Modified Forms	Ongoing
DRD 31-0-6	Forms Development Standards	Due 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 31-0-7	Forms Development Training	Ongoing
DRD 31-0-8	Forms Communication Plan	Due 60 days after contract award; Quarterly thereafter (or more frequently upon ITCD request)
DRD 31-0-9	Test Plans for New or Modified Forms	Ongoing

32.0 Forms Management Support and Services

The NASA Electronic Forms (NEF) system is an electronic library of Agency and Center forms accessible on the Web. The NEF system is a suite of tools for filling out, signing, submitting, archiving, and tracking electronic forms. All NASA forms, both Agency and Center-specific, are available in the

NEF system, which allows users to search for and download forms. The Agency uses LiveCycle as the NASA electronic forms solution. All Center forms management teams are converting and migrating their forms to Adobe LiveCycle.

ITCD provides forms management support for Headquarters form owners and Agency form owners. In support of the forms management service the contractor shall develop, implement, and maintain both Agency and HQ operational forms. "Forms" refers to paper forms, metal or other signs, media and other labels, and forms produced by electronic means as referenced in NASA Policy Directive (NPD) 1420.1A, NASA Forms Management Policy. In support of this activity, the contractor shall:

- a. Provide SME level of support to the Agency Forms Officer (AFO), HQ Forms Manager (HQFM), forms sponsoring offices, form owners, and the NASA Electronic Forms Working Group (NEFWG);
- b. Conduct outreach, communications, and training in support of the Forms Management Program as defined in this PWS, section 4.3, Customer Education and Outreach;
- c. Produce and maintain forms management SOPs and forms design standards that are in compliance with NPD 1420.1A and Business Forms Management Association (BFMA) guidelines;
- d. Design, produce, publish, and maintain Agency and HQ forms in either electronic media or hard copy as defined by the sponsoring organization's requirements for the form;
- e. Apply Agency printing and publishing standards to forms in accordance with NPD 1490.1, NASA Printing, Duplicating, and Copy Management;
- f. Maintain a repository of Agency and HQ forms via web access from the NASA Electronic Forms (NEF) application;
- g. Maintain the inventory of hard copy forms that are located at NASA HQ storage facilities;
- h. Manage the forms case files in accordance with NASA Procedural Requirement (NPR) 1441.1, NASA Records Retention Schedules;
- i. Create new or update forms upon request by form sponsoring organizations or at the direction of the Agency Forms Officer (AFO) or HQ Forms Manager (HQFM);
- j. Work with form owners to ensure that new and updated forms meet requirements related to the Privacy Act, Paperwork Reduction Act, and other legislative requirements, in accordance with NPR 1382.1A, NASA Privacy Procedural Requirements;
- k. Conduct the Biennial Forms Review for both Agency and HQ forms as required in NPD 1420.1A, NASA Forms Management Policy summarizing the data collection required for each biennial review;
- l. Provide data quarterly to the HQFM identifying all HQ forms revisions, cancellations, and new forms for the production of the HQ Forms Bulletin;
- m. Provide data quarterly to the AFO identifying all Agency forms revisions, cancellations, and new forms for the production of the NASA Forms Bulletin;

- n. Maintain the forms inventory databases for all Agency and HQ forms, and provide reports on demand to the AFO and HQFM;
- o. Provide recommendations to the AFO/HQFM for forms enhancements, potential forms consolidation, and/or workflow migration to existing systems;
- p. Provide recommendations to the AFO/HQFM for methods to increase economy, efficiency, and productivity of the Forms Program;
- q. Provide metadata and metrics information to the AFO and HQFM regarding the status of Agency and HQ forms, including but not limited to the following information:
 - 1. Total inventory count (active, inactive, cancelled, etc.).
 - 2. Type of form (hard copy, sign, electronic).
 - 3. Count and detail of forms collecting PII or other SBU.
 - 4. Count and detail of form complexity (including workflow).
 - 5. Count and detail of forms compliance with NASA Records Retention Schedule identifiers.
- r. Attend the NASA Electronic Forms Working Group (NEFWG) meetings and other forms management meetings as requested;

DRD	Description	Frequency
DRD 32-0-1	Biennial Forms Review Final Report	Report due end of August biennially
DRD 32-0-2	Quarterly status report of forms created or modified	Quarterly report

Metric #	Description	Metric
Metric 32-0-1	Create, revise or cancel forms as indicated in the Biennial Forms Review final report	98% of updates are completed within 90 days of the report delivery

33.0 Records Management

All Federal employees are required by law and Agency policy to maintain and preserve records. Federal Regulations 36 CFR Part 1220 and 1222, along with NASA Policy Directive (NPD) 1440.6H, NASA Records Management, state the requirements for records management. The heads of Federal agencies are responsible for preventing any unlawful alienation, alteration, removal, or any accidental or unauthorized destruction of records, including all forms of mutilations. In addition, they are responsible

for ensuring that all employees are aware of these provisions in the law and that any such action be reported to them or the Agency Records Officer.

The HQ Records Management services provide support to HQ users to facilitate the designation, maintenance, and protection of vital records, and provide guidance for identification, preservation/storage, and protection of records against loss, theft, and unauthorized release or change regardless of the record form.

33.1 Management of NASA Headquarters Records

The contractor shall provide records management services at NASA Headquarters. This involves the storage, disposal, and retrieval of retired Government records for customers. The contractor shall support customers in the correct preparation of newly retired records for storage at the Washington National Records Center (WNRC) in Suitland, MD. The contractor shall utilize the Archives and Records Centers Information System (ARCIS) to complete records management transactions with WNRC as required. The contractor shall complete the Standard Form 135, and coordinate transportation of records to and from Suitland or other locations. Upon receipt of the box contents list and SF 135 from the customer, the contractor shall review and complete the SF 135 and coordinate transportation of records to and from Suitland or other locations.

In support of records management, the contractor shall:

- a. Coordinate disposal, retrieval, or renewal notices from WNRC with the NASA Headquarters Records Manager as applicable and contact the appropriate customer to determine if the records are to be terminated or renewed;
- b. Maintain logs or transactional database and files for all records and records transactions;
- c. support NASA Headquarters Records Manager in training current and new employees in records management;
- d. Provide support in the review, approval, and denial of file and storage cabinets;
- e. support the NASA Headquarters Records Manager in the declassification effort on all classified documents 25 years of age or older as required by Executive Order 12958, including maintaining the computer database of all materials reviewed;
- f. Support the NASA Headquarters Records Manager in developing and implementing policies, procedures, and strategies associated with records reviews/self-assessments to include, but are not limited to:
 - i. Planning, promoting, and leading annual self-assessment orientation sessions; planning and executing annual self-assessments to ensure permanent and official records, regardless of medium, are selected, identified, located; and protected; preparing the self-assessment annual report; following up with non-compliant organizations until all issues are closed; and preparing status reports on self-assessment activities.

DRD	Description	Frequency
DRD 33-1-1	Records disposal report	Monthly

Metric #	Description	Metric
Metric 33-1-1	Storage Requests processed within 5 workdays of receipt	96% completed within the 5 workday period

33.2 Management of Contractor Records

The contractor shall maintain data qualifying as Federal records in compliance with Federal and Agency records requirements as required by the Federal Records Act, 44 U.S.C. §§ 3101 et seq. as codified in 36 CFR 1220-123 and including Federal Enterprise Architecture (FEA) Records Management Services functional requirements. NASA HQ owns the rights to all electronic information (electronic data, electronic information systems, electronic databases, etc.) and all supporting documentation created as part of this contract. In support of Records Management the contractor shall:

- a. Effectively and efficiently manage records, regardless of format or media (including paper, microform, electronic, and audiovisual);
- b. Preserve, maintain, and only dispose of NASA records in accordance with authorized retention schedules such as NPR 1441.1, NASA Records Retention Schedules and the National Archives and Records Administration's General Records Schedules. Destruction of any Federal records, regardless of format, without an approved schedule is a violation of Federal law;
- c. Whenever the contractor develops or provides systems or applications, the contractor shall ensure that records management and records archival functions are addressed in the requirements phase for the design, development, and implementation of new or significantly revised information systems;
- d. Ensure systems protect the trustworthiness of electronic records, including their reliability, authenticity, integrity, and usability to meet its internal business and legal needs, as well as external regulations and requirements within NPD 1441.D1; and
- e. For systems or applications created or supplied by the contractor that contain Federal records, develop sufficient technical documentation of the system or application such as design and maintenance records. Such documentation and maintenance records are Federal records and shall be managed as such.

34.0 Printing and Design (Communications Support Services Center-CSSC)

The mission of ITCD is to support NASA Headquarters (HQ) and the Agency by providing world-class information products and solutions via the Communications Support Services Center (CSSC). The CSSC is vital for the delivery of reliable, consistent internal communications, education, and public outreach programs and dissemination of information for business and mission support operations.

The Contractor shall be responsible for supporting coordination and management of liaison activities for Printing and Design (Communication Support Services at ITCD's discretion and approval). The Contractor shall provide this support to the ITCD staff and Government Printing Office (GPO). This

support includes the current Government approved contract vehicles, and new contract vehicles in the future.

The Contractor shall be responsible for collaboration with Government personnel and other contract support personnel that support the Printing and Design Communication Support Services.

The Contractor shall be responsible for supporting current and future Task orders in support of the all HQ customers to include but not limited to Mission Directorates, Administrator's Office, Office of the Chief Information Officer, Human Capital, Human Resources, Chief Financial Officer, Small Business, Office of General Council, and Facilities Office.

The Contractor shall provide annual updated proposals as requested by the Task Monitors to identify changes to the original proposals such as but not limited to adding or deleting services or work hours.

The Contractor shall be responsible for providing mobile application design and support when requested in addition to printing purchases using the GPO Purchasing Vehicles to include but not limited to Direct Deal Contracts, Standard Form 1 (SF1) and Simplified Purchasing Agreements (SPA).

As authorized by individual service requests, the Contractor shall deliver all services provided by the CSSC and is responsible for its staffing and operations. The CSSC primarily supports customers located at NASA Headquarters however, support may also be provided for any of the NASA Centers. On occasion support may include work products from other Government Agencies or entities with which NASA has an alliance.

All printing and design services shall be provided in accordance with applicable laws, regulations, and NASA procedural and regulatory guidance. NASA is fully committed to ensuring that Electronic and Information Technology fully complies with Section 508 of the Rehabilitation Act. Any product or service provided under this contract that has functionality within the areas of service covered by this contract shall comply with Sections 508 Standards Section 1194.22 and Section 1194.24 of this Rehabilitation Act. The Contractor shall reference <http://section508.nasa.gov/> for details about NASA compliance measures and compliance resource information. The contractor shall adhere to all NASA, Joint Committee on Printing (JCP) and Government Printing Office (GPO) legal requirements.

The CSSC contract currently has nine Task orders of which eight are in support of specific directorates, this number is subject to change based the Governments requirements. Each Tasks monthly hours are based on the specific needs of the Task/Directorates graphic support needs, the number of hours is dependent the Government's requirements.

The Contractor shall provide a Transition Plan to assume responsibility for the current support services requirements as described in this Performance Work Statement Section before and after the expiration date of the current contract vehicle on February 28, 2018.

The Contractor shall:

- a. Provide expert level support and value-added guidance on printing and graphics to ITCD Staff to support Headquarters and the Agency business requirements;

- b. Develop cost effective solutions for its customers Communications Support Services Center (CSSC) requirements;
- c. Provide an environment that fosters development of custom products in a robust and evolving environment and take full advantage of industry standards and emerging technologies;
- d. Operate the NASA Headquarters CSSC environment in an efficient and effective manner;
- e. Support NASA Headquarters requirements that utilize specialized skills and knowledge of technology trends to significantly increase productivity and efficiency;
- f. Provide excellent customer service for a variety of CSSC disciplines and functional areas;
- g. Collaborate and serve as Liaison to other Headquarters and Agency contractors to develop and provide seamless services to all customers.

The specific support services required under this contract include the following: Program Management support (outlined in PWS Section 2.0), Creative Design Services, Printing Management Services, Replication Support services, and Document Support Services

The NASA HQ Customer Communications Support Services Center Management requirements include but are not limited to the following:

- Development, production and delivery of lithographic print and replication products
- Graphic Design and Editorial Support
- Animation
- Video
- Multimedia
- Exhibit Design
- CSSC Web Site Content Development and Posting
- eBooks
- Digital Publications
- Social media and new technologies
- Section 508 File Conversion

34.1 Communications Support Services Center Management Support

The Contractor shall provide the managerial support with the specific skills and knowledge in all areas of CSSC Service Offerings to enable the identification of cross-project dependencies, risks, issues, requirements, design, or solutions required to manage the overall program.

The Contractor shall provide the resources to support the following functions:

- Provide oversight on all projects and will use this oversight to support project-level activities ensuring that overall program goals are met

- Provide guidance and oversight in incorporating emerging technologies and innovations that reduce the time and cost of products and services while maintaining NASA's high quality standards
- Collaborate with the appropriate IT resources to maintain the operation of all hardware and software assets on the contract
- Interface directly with the Task Monitor or COR on contract requirements, schedules, costs, problem resolution, and all other pertinent matters
- Provide full-time and on-site support for this function
- Provide support during non-duty hours for emergencies and management guidance

34.2 Liaison Service Support

The Contractor shall provide liaison Service Support Resources with specific skills and industry knowledge and shall:

- Interface with customers to help define and initiate projects, develop project schedules and cost estimates
- Provide recommendations and have an industry understanding of design and printing production in order to offer innovative, efficient, cost conscious and creative solutions to the customer
- Provide liaison support between the CSSC creative staff and the customer point of contact
- Inform and keep the customer abreast of any changes in schedule or cost and expedite the resolution of any issues as they arise
- Update project data in the task management system and report to the Program Manager on the status of all open jobs
- Support and assist with resolving all customer survey issues
- Update/document the database or system of record with results of survey ratings and or corrective actions performed.

34.3 Customer Service Desk/ Work Intake

The Contractor shall establish and maintain a Customer Service Desk or In-Take Desk in location designated by the government (Presently in Room CL78). Customer Service Desk/Work Intake activities shall include but not limited to the following

- Answer questions about submitting service requests
- Field general information about standard products
- Provide guidance on NASA's branding requirements
- Assist the customer select the correct products and service from the online website request form that best suits their needs.
- Expedite the requirements/information capturing process
- Initiate CSSC service request

- Provide applicable CSSC service consultation via the main customer service phone line and by email

34.3.1

The Contractor shall also perform the following:

- Track an inventory of standard products for the CSSC and manage the movement of standard products to/from the GSFC warehouse (product Inventory is maintained by GSFC)
- Maintain the CSSC storeroom keeping the space organized and free from excess clutter
- Manage the storehouse of GPO Blue Label Samples and the disposition of them in coordination with the print specialists
- Initiate service calls on the High Capacity Duplicating Devices (Presently -Xerox 550, Xerox 4127 and Xerox 1000) to the government's defined device maintenance contract provider when applicable
- Maintain government defined supply levels, and manage paper stock
- Contact customers for product pickups requirements

34.3.2

The Contractor shall staff the CSSC Customer Service Desk/Work Intake Desk from 8:00 a.m. to 4:30 p.m., Monday through Friday, except Government holidays. The Contractor shall ensure that adequate resources are available to support the Customer Service Desk requirements, which include liaison between the Government customer and the other functions within the CSSC.

34.4 CSSC Task Management System

To support documentation, data management and Access to service related information the Contractor shall manage the Government provided task management system to support this effort the contractor shall:

- Manage the production of products from the initial service request through the close out and archive of project files
- Utilize a framework of standard operating procedures and industry standard workflows to provide accountability and quality assurance on all projects submitted by the customer
- Enhance and modify the system as necessary to keep the processes and workflows current to meet the needs of the customer
- Provide accurate bill-back information to all codes/sub codes on a monthly basis
- Shall provide system generated reporting and ad-hoc reporting as required to meet the varying needs of the customers and ITCD

34.4.1

The Contractor shall:

- Organize and classify projects in such a manner as to facilitate the collection of production metrics
- Utilize the Government provided Task Management System to capture and report production metrics to the Task Monitor or COR with recommendations for improving efficiencies and quality of product
- Provide a mechanism for capturing customer feedback and reporting the information as a quantitative deliverable to the Task Monitor or COR
- Provide a quality assurance mechanism to address unsatisfied customers

34.5 Installation Accountable Government Property

The Government will provide all space, equipment, software, and supplies necessary for the operation of the CSSC. The current inventory of facilities equipment will be included as an Attachment to the contract.

Throughout the life of this contract, the Contractor shall:

- Conduct assessments and recommend to the Task Monitor or COR of any and all CSSC maintenance or repairs required
- Ascertain that such maintenance or repairs have been properly performed
- Maintain a current inventory of all stocked supplies, and make timely requests to the Task Monitor or COR for the stocking or restocking of all necessary supplies

34.6 IT Security Compliance

See Section 16 of this PWS IT Security Compliance.

34.6.1 IT Security Training Compliance

See Sections 16 of this PWS IT Security Training Compliance.

34.7 Hours of Operation

The normal hours of operation of the HQ CSSC are from 8:00 AM to 4:30 PM, Monday through Friday, excluding Government holidays. The only exception is the Replication Support Services (RSS) function, for which the normal hours of operation are from 7:00 AM to 5:00 PM, Monday through Friday, excluding Government holidays.

However, as necessitated by specific government requirements, the Contractor shall assist users outside normal hours of operation. Examples of Special Government Requirements:

- a. Specific customer requests may require that some CSSC services areas provide ongoing production outside normal working hours (i.e., night shifts, weekends, and holidays) to support Federal Mandated Documents.
- b. When providing on-site printing inspections at local printing vendor facilities for Government job requirements could extend the CSSC staffing time beyond the normal hours of operation.

When after hour support is required, the Contractor shall:

- Obtain advance approval from the Task Monitor or COR for any production hours required outside the normal hours of operation.
- Provide the Task Monitor or COR, Printing Officer and the Division's Financial Analyst with an estimate of the additional costs for overtime production.

34.8 Service Awareness

The Contractor shall provide comprehensive information on the capabilities of the CSSC and the services provided. Such information shall be provided to all potential users of the NASA HQ CSSC using:

- Brochures
- HIT 25 (TV)
- Heads UP (Elevator hallway paper notice)
- Banner (West Lobby and East Lobby)
- Maintain galley images/photographs and video display/players in the Great Hall and NASA HQ 9th Floor Senior Administrative (A-Suite)
- CSSC website
- Other communication mechanisms as specified by the Task Monitor or COR
- All of which shall be developed and maintained by the Contractor

If a user's request for CSSC support shall require a specific Task Order, the Contractor shall provide capabilities statements to the CO, COR and Task Monitor in final draft form for review and approval prior to their issuance.

If the Contractor receives a request for service(s) outside the publicized capabilities scope of the contract, the Contractor shall refer the customer to the CO, COR and Task Monitor for guidance, resolution and approval.

34.9 Safety and Housekeeping

The Contractor shall maintain a well organized and safe work area, ensuring at all times that it is free and clear of all safety hazard(s). In addition to providing safety training on all equipment being operated by its employees, the Contractor shall ensure that its employees and managers are informed of NASA's and other pertinent safety concerns.

The Contractor shall perform regularly scheduled preventative maintenance on NASA equipment such as:

- Cleaning after use
- Checking all fluid and toner levels
- Checking proper positioning of operator installed canisters or cartridges, (as recommended by the equipment manufacturer)

Major mechanical maintenance of CSSC production equipment (printers, cutters, hole punch, etc) shall be provided by the government upon contractor notification of necessity unless mechanical breakdown is a direct result of a Contractor action to cause intended damage or destruction of Government property.

The Contractor shall manage supply inventory levels, with supplies ordered on a frequency that adequately meets departmental material needs. Such supplies include consumable materials needed to provide services and perform minor onsite equipment maintenance. The Task Monitor or COR will provide the Contractor with information regarding sources from which supply orders can be verified. The Contractor shall utilize all aspects of the NASA procurement process to ensure that supply/inventory orders placed from approved NASA supplier lists and meet all letters of the law pertaining to governmental procurement activities.

The Contractor shall maintain all records in accordance to Government Records Retention regulations.

34.10 Quality Assurance Requirements

The Contractor shall provide quality assurance for all products and services delivered. Specifically, the Contractor is responsible for assuring conformance of products and services for the following:

- Requirements
- Methods, and standards established by NASA
- Including verification and validation

The Contractor shall develop, implement, and maintain services, specifically, quality assurance policies, plans, and procedures that ensure that products and services conform to job requirements. The Contractor shall meet all Government and NASA regulations and policies. The Contractor shall provide a Quality Assurance Surveillance Plan (QASP) to manage and maintain quality standards

DRD	Description	Frequency
DRD 34-10-1	Quality Assurance Plan	30 Days prior to contract start

34.11 Creative Design Services (CDS)

The Contractor shall provide products and services that promote a strong awareness and understanding of the programs, missions, and activities of NASA HQ and NASA. These products and services are distributed through numerous types of multimedia. Due to the visual, artistic nature of this work and its complexity, close coordination with the Government customer is required.

The Contractor shall provide complex visual designs and art products generally intended for orienting external audiences to NASA's programs and mission; however, the products may also be intended to meet communication objectives within the Headquarters/NASA employee/Candidate community.

Possible projects include:

- Interactive digital publications for tablets and other mobile devices
- eBooks
- Social media content
- Interactive multimedia presentations
- Digital photography
- Video
- Animations
- Brochures
- pPosters
- Flyers
- Fact sheets
- Programs
- Reports
- Awards
- Certificates
- Matting and framing
- Exhibit installations
- Hallway exhibits
- Interactive kiosks
- Pop-up exhibits
- Academic and technical historic publications
- PowerPoint presentations
- Scanning
- Signage
- Newsletters
- 508 tagging and more

The Contractor shall file and store all graphics and publication work that is generated within the Task Management system. The Contractor shall ensure that all computer files are safeguarded and retrievable. The Contractor shall work with other NASA contractors to maintain all backup systems for graphics and publication products on file servers or other methods approved by the Task Monitor or COR.

The Contractor shall maintain records within The Task Management System for extracting production and cost accounting data. The Contractor shall prepare and submit required activity reports in accordance with contract data requirements as required by this PWS.

The Contractor shall provide product and service quality to match the Government customer requirements. Product deliveries shall consist of items produced within the NASA Communications Material Review (CMR) guidelines for NASA communications materials production.

The Contractor shall maintain an ongoing knowledge of the most current software packages necessary to perform the duties of the CSSC. The Contractor shall make recommendations to the Task Monitor or COR for new or upgraded equipment or software, or modifications thereto, which will increase production efficiency or product quality. At the sole discretion of the Government, new or modified equipment or software may be provided as Installation Accountable Government Property.

DRD	Description	Frequency
DRD 34-11-1	Summary Activity Reports	Monthly

34.12 Graphic Design

The Contractor shall provide high-level design based on NASA Style Guides, Commercial Industry Standards (Such as GATF) and GPO Quality Standards for electronic and print deliverables. The contractor shall provide product designs for the following:

- Offset printing+
- Digital delivery on mobile devices
- Internet
- Standalone exhibits and interactive installations

The Contractor shall provide the resources and skills to perform any or all of the following tasks:

- Creative conceptualization
- Comp development
- Storyboarding
- Research

- Creative writing
- Graphic layout
- Graphic design
- Art direction
- Illustration (freehand and digital)
- Prepress verification
- Digital photography

34.13 Animation

The Contractor shall provide 2D and 3D animation for use in video, multimedia, web, and mobile devices. The Contractor shall work closely with the client to develop technically accurate models of space and aeronautic vehicles, create complex environments, and illustrate technical scientific concepts using a combination of 2D and 3D animation tools. In addition, the contractor shall also be able to construct animations appropriate for a K12 audience that are engaging and useful for education outreach products.

34.14 Video

The Contractor shall provide high-quality videography for use online, as part of exhibit installations, standalone DVDs, and as content for inclusion in multimedia presentations. The Contractor shall be well versed in the latest tools and techniques available for editing video and sound. The Contractor shall have an understanding of compression techniques useful for packaging video products for distribution on multiple platforms and make recommendations on new hardware and software necessary to keep NASA on the cutting edge of video technology.

34.15 Multimedia

The Contractor shall provide high quality multimedia products for use online, as part of exhibit installations, standalone DVD and for inclusion in digital publications on mobile devices. The Contractor shall create education outreach materials focused on the:

General public education products focused on the following topics:

- Science
- Technology
- Engineering and math,
- Internal technical audiences

The Contractor shall also be well versed in the latest tools and techniques available for creating multimedia content and packaging that content for use on multiple platforms. The Contractor shall make recommendations on new production tools necessary to keep NASA on the cutting edge of multimedia technology.

34.16 Exhibit Design

To support the HQ Exhibit requirements the Contractor shall:

- Research
- Design
- Fabricate
- Test,
- Deliver
- Install
- Make operative

A series of interpretive exhibits and possible companion traveling exhibit(s) for NASA.

These exhibits may include multimedia, video, or other interactive components that showcase the purpose and benefits of the Agency. The audience will include the general public, internal technical audiences, and K-12 audiences. NASA will provide all exhibit structures, banner stands, LCD, and Kiosk equipment.

34.17 eBook

The Contractor shall provide the creation of eBooks. The contractor shall:

- Maintain the eBook website and coordinate with the appropriate IT contractors for posting new content
- Monitoring eBook metrics across the agency
- Review eBook files from NASA centers for final eBook approval
- Develop training materials and provide training to other NASA centers on the creation of eBooks

In addition, the contractor shall provide continual updates to the eBook Knowledge Center webpage and video training pages. The Contractor shall provide current technology, format trends across the industry and provide recommendations for staying on the leading edge of eBook products.

34.18 Social Media/New Technologies

The Contractor shall support Social Media activities that accelerate the interaction between users by expediting the participation, sharing, blogging, networking, and linking of information. Social Media includes social networking, social sharing, as well as social media marketing. The contractor shall track current social media trends and maintain the staff and training to support emerging technologies. The Contractor shall plan social media elements in conjunction with traditional media campaigns and work with the appropriate IT contractors to launch and track the results of the social media implementations. At a minimum, the contractor shall support as required the following Social Media vehicles:

- Facebook,
- Twitter
- You Tube,

- LinkedIn,
- Flickr,

In addition, blogging infrastructures as well as other emerging technologies, as they become appropriate communication tools for the customer.

34.19 Editing/Writing

The Contractor shall provide varying levels of editing and proofreading guided by the customer's requirements and be well versed in AP, Chicago, GPO and NASA specific style guides and their appropriate application and hierarchy when editing. The Contractor shall make recommendations appropriate to the product and customer requirements and engage in the quality assurance of all edited materials produced within the CSSC. The Contractor shall adhere to the NASA Branding Style guide and the NASA production toolkit.

The Contractor shall provide creative and technical writing appropriate to the project. Authors research, interview, and access the necessary technical documents required to meet the customer's end-product requirement. The Contractor shall work closely with the editing staff to incorporate and improve the quality of the deliverable.

34.20 508 compliance

The Contractor shall provide 508 services in accordance with applicable laws, regulations, and NASA procedural and regulatory guidance ensuring that Electronic and Information Technology fully complies with **Section 508 of the Rehabilitation Act**. The contractor shall reference <http://section508.nasa.gov/> for details. The Contractor shall provide 508 services at the direction of the Government.

34.21 Creative Technology Support

The Contractor shall provide the resources to support Creative Technology requirements to support the CSSC. The resources supporting this service requirement shall keep abreast of emerging technologies (hardware, software, trends, and devices) that positively affect the information-seeking experience of NASA.

The Contractor shall:

- a. Research new technology trends, innovations and new Research and Development findings,
- b. Make recommendations to management for hardware and software (e.g. applications for Augmented Reality, tracking the development and use of digital markers etc.) that the CSSC should consider to stay abreast of NASA's changing technology environment.

The Contractor shall evaluate the CSSC's current technology holdings and make sure updates to existing hardware and software are maintained current. In addition, the Technology Specialist shall:

- Research industry trends for communication products
- Attend Technology seminars, webinars, gatherings, etc. and report to CSSC and NASA Management
- Research specific software/hardware requirements to meet customer request, then test and evaluate for purchase
- Provide technology updates to staff
- Coordinate the ordering of all hardware and software through approved NASA procurement channels
- Inventory of all assets under CSSC bi-annually
- Receive and verify all ordered assets
- Coordinate loading of new software assets with Program Manager and end user services and technical support contracts as required.
- CSSC Website Maintenance

Prior to making changes the Contractor shall coordinate and obtain government approval for CSSC Website modifications. The contractor shall provide a monthly report to the government listing all updates to the overall CSSC Website planned and completed. The support center includes Creative Design Services, Replication Support Services, Document Support Services, and Printing Management Services. The contractor shall provide an Update Status Report to the COR referencing updates made.

This includes the design, layout, format, photography, rich media, editing, and update of this website and its resident pages that shall be approved by the COR prior to implementation.

DRD	Description	Frequency
DRD 34-21-1	Update CSSC Web Site to reflect product or service modifications Status Report	Monthly

34.22 Communication Effectiveness

The Contractor shall be knowledgeable in trends, techniques, technologies, and venues for communication products and present ideas for effective communications. Provide analysis and consultation on systems, tools, and processes to evaluate communication effectiveness and customer satisfaction. Assist with audience research to tailor communication products to the intended audience(s). Develop and suggest strategies to develop communication products that promote messages

that are consistent with NASA's overarching themes and messages using various media products and venues.

34.23 Design Services Restrictions

Contractor management shall maintain current budgets for each Government customer area, and maintain a current database with approvals from various offices, an authorized Government customer list, an updated approver list and co-signature list.

Periodically, the Contractor may need to procure specialty services from outside NASA HQ (i.e. metal plaques, large banners). In this case, the Contractor shall provide:

- a. Statement of Procedure (SOP) to document the process by which Government customers can procure services outside NASA HQ and the mechanism for payment
- b. In addition, a Memoranda of Understanding (MOU) for Contractor-to-Contractor collaborative work efforts

The Contractor shall maintain current information for these specialty vendors, their customer service specialists and pertinent creative personnel to ensure they provide accurate information and guidance to Government customer-base on production requests.

DRD	Description	Frequency
DRD 34-23-1	Proposed SOP for Procuring Printing and Graphics Services Outside of NASA CSSC Process	30 Days after contract start
DRD 34-23-2	Proposed MOU for Contract to Contract Collaborative Work	30 Days after contract start

34.24 Ancillary Equipment Operation

The Contractor shall maintain up-to-date knowledge of current and evolving technical equipment used to provide creative services.

The Contractor shall operate all equipment in the designated facilities, and assure the repair and maintenance of equipment is processed in a timely and systematic fashion.

CSSC Equipment inventories also include Government Owned equipment. The contractor shall include these items in its daily operational and maintenance requirements to support continuity of production capabilities.

34.25 Printing Management Services (PMS)

The Contractor shall provide resources with specific knowledge and skills in industry standards and processes (compatible to the Government Printing Specialist classification) to support CSSC requirements and serve as the Contractor agent in Government printing activities. The provided resources shall manage all operations of the print program and serve as the Subject Matter Expert (SME) for questions pertaining to printing, binding, and distribution.

The Contractor shall provide services for the placement of printing requests or Government Printing Office (GPO) riders to the Government Printing Office or other Government printing facilities through:

- a. One time Bid procurement (Standard Form1 (SF1))
- b. Direct Deal GPO Contracts
- c. Simplified Purchase Agreement Program

The contractor shall support the movement of printed materials to digital publications, as technology is appropriate and provide cost effective alternatives to traditional publication products.

The Contractor shall perform all printing requests in accordance with the following:

- This PWS and the requirements outlined in NASA Procedural Guidance for Printing, Duplicating and Copy Management
- NPD 1490.1H; Government Printing and Binding Regulations, Joint Committee on Printing (JCP), Congress of the United States, February 1990
- Title 44 U.S. Code of Federal Regulations Sections 501-517 and 1101-1123
- Title 14 U.S. Code of Federal Regulations, Chapter 5, Part 1221
- In addition, all other Government regulations applicable to printing services

The Contractor shall manage all operations of the print program and serve as the Subject Matter Expert (SME) pertaining to printing, binding, and distribution.

Additionally, the Contractor shall:

- Generate all printing and GPO Rider print orders
- Place all print orders
- Preflight all work
- Update the Task Management System
- Maintain the Publication Numbering and Printing Contract database
- Receive proofs
- Coordinate proof inspections with Government personnel
- Return proofs
- Provide press sheet inspections (when required)
- In addition, monitor production compliance for schedule and on time delivery performance

The Contractor shall monitor compliance for product quality based on the guidelines outlined in the Government Printing Office (GPO) Contract Terms, (GPO Publication 310.2), effective December 1, 1987 (Rev. June-2001) and GPO Contract Terms, Quality Assurance Through Attributes Program for Printing and Binding (GPO Publication 310.1), effective May 1979 (revised August 2002). The contractor shall be responsible for quality control for all functions performed and shall communicate with the Government customers to clarify any questions or issues.

34.26 Installation Accountable Government Property

The Government shall provide all equipment, software, and devices necessary for the operation of the CSSC - Printing Management Services area. The current inventory of facilities equipment will be provided.

34.27 Replication Support Services (RSS)

In carrying out RSS operations, the Contractor shall operate and maintain equipment and perform all services in accordance with the requirements of this SOW and other Government regulations applicable to the daily operation of a Duplicating Center.

The Contractor shall be responsible for overseeing administrative tasks and new duplication technology implementation in support of NASA Headquarters.

The Contractor shall provide knowledge and expertise of digital reproduction systems and associated binding and finishing equipment. The Contractor shall be able to multi-task projects and problem-solve production issues to provide the customer with the most cost effective and efficient product available that meets government requirements. The Contractor shall interface with the customer to offer suggestions for production and binding. The Contractor shall be responsible for monitoring supply levels and make the appropriate arrangements for ordering and warehousing supplies. The Contractor shall maintain and update all information within the Task Management System. The Contractor shall be proficient and have advanced level operator knowledge on the following machines: Xerox Color 1000, Xerox 4127, and Xerox 550. The contractor shall ensure staff training is maintained to support equipment changes and or model enhancements.

The Contractor shall produce work within NASA Communications Material Review (CMR) guidelines for all NASA communications materials production.

34.28 Duplicating Volume Restrictions

The Contractor may reproduce up to sixty thousand (60,000) impressions per job, or follow NASA policy in accordance with the NASA-wide Printing Officer directives. Copies of these publications will be provided to the Contractor by the Task Monitor or COR.

Duplication of impressions in excess of 60,000 per job is accountable to the Joint Committee on Printing (JCP) and is known as a “reportable”. Prior to duplicating any job for which the total impressions shall exceed 60,000, the Contractor shall notify the COR for authorization to proceed.

34.29 Special Records Requirements

RSS special records requirements are outlined in Appendix A, JCP 1 Reportable.

34.30 Ancillary Equipment Operation

The Contractor shall operate and maintain all equipment ancillary to the copying function listed in Appendix A Equipment Maintenance Contracts. This includes:

- The 3-hole drill
- Tying machine
- GBCGBC binder
- Power paper cutter
- Folders
- DIGI Coil
- Stitcher

34.31 Hours of Operation

See PWS Section 34.7 for reference to Hours of Operation

34.32 Document Support Services (DSS)

In carrying out DSS operations, the Contractor shall provide support for the preparation of publications and documentation services to NASA Headquarters (HQ) Government customers in their efforts to publish technical and non-technical documents or presentations.

The Contractor shall provide desktop publishing services to include, but not limited to the following:

- Preparation of PowerPoint slides,
- Standard product preparation
- Specialty certificate preparation
- Typing,
- CD and DVD media duplication
- Charts and graph preparation
- Scanning, OCR support,
- PDF creation and tagging,
- Editing
- Web page updating

- Dictation tapes
- Revisions to documents
- Reports

In addition, other desktop document services as required by the customer. The specialist shall maintain and update all information within the Task Management system.

The Contractor shall prepare all documents in compliance with both the NASA Correspondence Manual and the NASA Communications Standards Style Manual.

The Contractor shall update content to the DSS portion of the NASA home page website monthly. The design, layout, formatting, editing, and updating of this home page shall be subject to the approval of the COR and designed in collaboration between DSS and the CDS website design and development team within CSSC.

34.33 Ancillary Equipment Operation

The Contractor shall maintain up-to-date knowledge of current and evolving technical equipment used to provide document support services.

The Contractor staff shall be able to operate all equipment in the designated facilities. If repair or maintenance of equipment is required, the Contractor shall place a call to the appropriate maintenance vendor in a timely and systematic fashion. The current inventory of facilities equipment is provided.

34.34 Online Services

The Contractor shall provide and post content development to the HDS portion of NASA HQ home page website monthly. The design, layout, formatting, editing, and updating of this home page shall be approved by the COR.

34.35 Ancillary Equipment Operation

The Contractor shall maintain up-to-date knowledge of current and evolving technical equipment used to provide document support services. HDS personnel shall have expert knowledge of processes and equipment used in data import technologies, scanning, publication design and webpage updating. HDS personnel shall have a general understanding of all equipment used within the companion CSSC groups for creative support, replication support, and printing management.

34.36 Product Delivery

The Contractor will receive content through various sources. Product generation, at intake, assembly, editing, manipulation, proofing, modification, or delivery may require digital file format and media

conversion during import, export, upload, and delivery. Final products shall be exported as digital files, made available online, or provided in hardcopy as a desktop published or printed product

34.37 Deliverables, Inspection & Acceptance

All deliverables shall be presented to the requesting customers within the assigned timeframe. All reports shall be delivered to the COR Information Technology and Communication Division, Communications Support Services Center for review and acceptance based on the due dates.

DRD	Description	Frequency
DRD 34-37-1	Transition Plan	25 days from start date of contract
DRD 34-37-2	Customer Survey Report – This report is sent at the close of each job to the customer. The results are then submitted back to the database. The customer survey report can be run for any period but is defaulted to run monthly	Every Friday
DRD34-37-3	Graphic Hours Report – This report pulls all the hours charged by the CSSC and totals them by ID Code. This report is used to bill hours back to the customers for work performed. The report can be run for any time but is defaulted to run monthly	15 th Day of the Month
DRD 34-37-4	Job Status with Comments – This report lists all open jobs information including the comments section of each job. The report can be run for any time but is defaulted to run monthly	15 th Day of the Month
DRD 34-3-7-5	Jobs Request by Level of Complexity – This report group's job request by their level of complexity i.e. level 1 job require the least amount of effort whereas level 3 jobs are the most complex and require the most amount of effort to complete. The report can be run for any time but is defaulted to run monthly	15 th Day of the Month
DRD 34-37-6	GPO Printing Report – This report list all open jobs with the job type GPO. This report can be run against any time	15 th Day of the Month

35.0 Infrastructure Services

The Headquarters Information Technology and Communications (ITCD) Division provides a full range of Information Technology capabilities and communications support for NASA Headquarters Mission Support Offices, Mission Directorates, and housing/hosting for Enterprise systems and services. The focus of ITCD is to assist Headquarters organizations and Enterprise service providers in achieving their mission through the optimum application of Information Technology (IT). The ITCD goals for Data Center services are to provide uninterrupted service of our housed and hosted assets; to facilitate service advertisement and analytics; to provision continuity with similar data centers and alternative sites; to reduce the data center's impact on our environment; to reduce its size and; to eventually reduce our dependence on a physical HQ data center by reducing its size to the greatest extent that is practical and provide cloud hosting services to HQ customers. ITCD has the responsibility to provide the optimal data center and computing environment for HQ systems and services. These responsibilities include assessment of business need, technologies, and determination of the optimal environment to host the service. These environments include the local HQ Data Center, HQ MCE, or other NASA or Federal data center facility.

In support of this requirement the contractor shall:

- a. On an as requested basis conduct technical evaluations and assessments of systems and services to determine the optimal hosting environment.
- b. Conduct assessments of systems and services developed external to HQ for hosting/hosting services and capabilities within the HQ computing environments.
- c. Ensure that all services hosted or housed within ITCD managed environments meet Federal and Agency policy for Data Protection, Information Assurance, Accessibility, and life-cycle management.
- d. Ensure compliance with Federal Data Center Consolidation Initiatives (FDCCI) and Agency Data Center Consolidation (ADCC) projects.
- e. Ensure alignment with the ITCD Strategic Plan goals and Tactical Plan initiatives to migrate to cloud services for all HQ systems, applications and websites currently hosted in the NHCC.
- f. Ensure consistent application of policy and Governance that is in alignment with NASA and HQ procedural requirements.

36.0 Cloud Services

The Headquarters Information Technology and Communications Division (ITCD) has a wide range of customers which include Administrator Staff Offices, Mission Directorates, Mission Support Directorate and other NASA Centers.

ITCD will use the Agency's Computing Services Service Office (CSSO) Managed Cloud Environment (MCE) within the Amazon Web Services (AWS) environment to provide application hosting, Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS), and Web

hosting services for NASA HQ and Agency customers. Amazon Web Services (AWS) provides a flexible, and scalable cloud computing platform for NASA HQ. The primary goal of these requirements is to manage NASA HQ ITCD Cloud computing services and manage the MCE within the CSSO AWS Environment, a logical data center located within a Cloud Service Provider's infrastructure.

NASA HQ will use and operate public and private (MCEs) in Amazon. The CSSO Cloud service will be responsible for provisioning and managing a Virtual Private Network/direct connect backbone to NASA Wide Area Network (WAN) and Amazon network infrastructure. The contractor shall have a full understanding of Cloud concepts, policies, procedures, and standards. The contractor shall have an understanding of requirements for NASA's Cloud strategies and have adequate certified and experienced staff in Amazon Cloud Services.

Environment Delivery and Management

The contractor shall be responsible for delivery and management of computing services through a Managed Cloud Environment that ensures adequate security measures are in place to protect NASA data.

In support of Environment Delivery and Management, the contractor shall:

- a. Provide development, test, stage, and production environments that will streamline the migration, implementation and support of current and future NASA HQ public and private facing websites and applications;
- b. Provide development, implementation, and on-going operations of the HQ MCE and service infrastructure within the MCE;
- c. Manage virtual machines, operating systems, network configuration, security, application-controls and applications that are accessible from a NASA network;
- d. Manage user access to Cloud resources;
- e. Provide management, maintenance, and configuration of IT components operating within an MCE;
- f. Provide compute and networking services for virtual cloud systems, cloud instance management, auto scaling and load balancing;
- g. Provide a storage and content delivery network for simple storage services, elastic block storage for secure, durable, data archiving and long-term backup;
- h. Provide virtual cloud instances for relational database services for multiple database deployments, such as MySQL/MariaDB, Oracle and SQL server;
- i. Provide non-relational databases such as MongoDB; and
- j. Provide support for the development and implementation of the migration strategy for Headquarters applications and websites to the HQ ITCD MCE.

Operational Monitoring

The contractor shall be responsible for operational monitoring services with the HQ MCE.

In support of Operational Monitoring requirements the contractor shall: For operational monitoring requirements, the contractor shall:

- a. Perform resource management, performance management, change management, and patch management;
- b. Respond to events and provide continuous monitoring;
- c. Develop a security plan;
- d. Operate cloud environment in compliance with agency policies and processes;
- e. Provide response to security events and Incident Response, security assessment report and documentation;
- f. Monitor continuously AWS cloud resources utilizing tools such as CloudWatch to monitor all Headquarters AWS resources with status checks (problems with instances), collect and monitor log files and provide system-wide visibility into resource utilization, application performance, and operational health;
- g. Monitor continuously elastic load balancers for status such as request count and latency; and
- h. Develop and communicate associated processes and standard operating procedures for cloud service management and operations.

Operational Management

The contractor shall be responsible for managing and operating the following AWS services products in all applicable MCEs such as GovCloud and Public Cloud.

The contractor shall support the design and architecting of the NASA HQ MCE, manage the configuration of AWS services, providing operations, maintenance, and sustaining engineering for the managed cloud services.

In performance of operational management, the contractor shall:

- a. Provide configuration, management, and scaling of distributed in-memory cache environments in the cloud;
- b. Perform system administration, log monitoring and reporting, problem identification and resolution, performance monitoring, and respond to service incidents;
- c. Provide regular backups of cloud instances following the schedule in the backup SOP;
- d. Provide documentation and management of all systems and sub-systems;
- e. Monitor continuously elastic load balancers for status such as request count and latency;
- f. Provide troubleshooting and recovery for instances in failed status; and
- g. Provide recommendations for optimizing performance of cloud services.

DRD	Description	Frequency
DRD 36-0-1	Semi-annual performance review and optimization recommendations	6 months after contract start, semi-annually thereafter
DRD 36-0-2	Report utilization status on all HQ operational AWS Service	Monthly and on demand
DRD 36-0-3	Report of Application Utilization	Monthly and on demand

DRD 36-0-4	Monthly configuration item change report for cloud resources	One month from contract start, monthly thereafter and on demand
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Metric #	Description	Metric
Metric 36-0-1	Systems and Applications Availability	> 99.95%
Metric 36-0-2	Measure application response time	> 99.95% Max response time for application < 5 seconds
Metric 36-0-3	Respond to application outage and within 15 minutes during business hours and 30 minutes after business hours with continuous effort until incident is resolved	> 98% responses within window

37.0 Reserved

38.0 Administrative Office Services

The contractor shall be responsible for providing on-site administrative office services in support of all HQ systems. Support for these requirements includes, but is not limited to, Account Administration, NASA Entrust PKI Administration, and Safety and Security Administration.

38.1 Account Administration

NASA has implemented the NASA Account Management System (NAMS), as part of NASA Enterprise Applications Competency Center (NEACC). Currently, NASA HQ new application account requests, changes, and deletions are processed through NAMS. Account Administration staff also receives NAMS add, modify and delete requests for network shares (user, shared and group folders). HQ Account Administration staff receives notification from NAMS when all the required approvals have been made for account requests and proceeds with provisioning or de-provisioning the requested access. The HITSS contractor is responsible for account provisioning and coordination for legacy services, which have not yet been transitioned to NAMS for access. The contractor shall manage accounts for HQ network domain and data servers, Entrust Public Key Infrastructure (PKI), File Transfer Protocol (FTP), and HQ custom applications.

The contractor shall be responsible for all account management to include the following but not limited to:

- a. Maintain up-to-date procedures for coordinating with IT Security, Help Desk, NAMS and others for account creation, modification and deletion;
- b. Provide password resets for local applications via the Help Desk processes;
- c. Provision and de-provision user accounts for custom applications as required by help desk requests or NAMS requests;
- d. Create Guest Network accounts;
- e. Provision user requests for access to specialized Microsoft networked folders;
- f. Provision new standard personal Microsoft networked folders;
- g. Support modifications to process and provide support to meet future NASA account management services;
- h. Adhere and comply with applicable regulations and policies (e.g., HSPD-12, NPR 2810.n, NASA PKI Registration Authority (RA)); and
- i. Regularly audit account accesses to ensure continued need for access (e.g. terminated users and disabled accounts) and ensure removing unneeded access accounts.

DRD	Description	Frequency
DRD 38-1-1	Semi-annually, audit standard operating procedures and report necessary updates and schedule	Six months after contract start, semi-annually thereafter or at the request of NASA
DRD 38-1-2	Monthly audit of active accounts with terminated users	2 months from contract start, monthly thereafter

Metric #	Description	Metric
Metric 38-1-1	Respond to application password reset requests during non-prime time hours within 1 hour and accomplish resets within 2 hours	<u>≥ 95% meet the performance metric</u>
Metric 38-1-2	Respond to application password reset requests during Prime Time hours within 10 minutes and accomplish resets within 30 minutes.	<u>≥ 95% meet the performance metric</u>
Metric 38-1-3	Respond to NAMS requests for provisioning and de-provisioning account access within 1 hour during core business hours (6AM to 6PM)	<u>≥ 95% meet the performance metric</u>

38.2 NASA Entrust PKI Administration

The contractor shall be responsible for support of processes associated with requesting, creating, modifying, and deleting Entrust Public Key Infrastructure (PKI) certificates.

- a. Pass a certification exam administered by the NASA PKI Certification Authority
- b. Add, modify, restore, and delete Entrust PKI Certificates in accordance with Agency procedures; and
- c. Ensure certificates are removed for terminated users

DRD	Description	Frequency
DRD 38-2-1	Monthly report of PKI adds, modifications, restores, and deletions	Two months after contract start, monthly thereafter
DRD 38-2-2	Monthly audit of active certificates that have terminated users	Two months after contract start, monthly thereafter

Metric #	Description	Metric
Metric 38-2-1	Requests for Entrust PKI certificate creation, modification, and deletion are accomplished within one business day	≥ 95% completed within the required time

38.3 Safety and Security Administration

Because of the sensitivity of the systems and services within the Data Center, and because of the potential damage that could be done by an individual who has physical access to the hardware and network within it, the NASA HQ Data Center has restricted access which must be vigorously maintained by the HITTS contractor.

The contractor shall:

- a. Monitor the physical security of the NHCC
- b. Work closely with HQ Security to control NHCC access provided to contractor and subcontractor personnel
- c. Comply with the policies and procedures for NHCC physical security in accordance with established procedures

DRD	Description	Frequency
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DRD 38-3-1	Monthly audit report of personnel with access to the NHCC	Two months after contract start, monthly thereafter
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39.0 Operations & Maintenance Services

The HQ Data Center is located on the concourse level of the HQ building. In support of the Federal Data Center cloud first initiative and the Agency strategy for Data Center consolidation ITCD is currently in the process of migrating all cloud capable services to a HQ Managed Computing Environment (MCE) in the AWS cloud environment. In addition to the physical HQ Data Center, ITCD will require the contractor to manage the HQ AWS MCE and any services hosted at the JPL NASA Management Office (NMO).

The services that are to be performed include but are not limited to: maintaining all environments in a manner that provides a secure and reliable computing environment that ensures the integrity, availability, and confidentiality of NASA information, data, and services. These services include the operation, maintenance, monitoring, account provisioning and removal, patching, life-cycle planning, and engineering of computing systems, physical and virtual servers, as well as support for the deployment or enhancement of systems, applications, and services.

39.1 Data Center Management

Management of the HQ Data Center responsibilities include but are not limited to the following:

The contractor shall ensure the availability and uninterrupted service of all physical and virtual servers, appliances, backup devices, storage devices, server monitoring, and other systems and subsystems that reside within HQ Data Center facilities.

The contractor shall provide on-site operations and maintenance support to all HQ systems and HQ Data Center environments. Data Center Management support includes, but is not limited to, HQ based services, HQ AWS MCE based services, and the JPL NMO based services, specialized services for commissions and study groups, file storage and data recovery, financial system portals, and similar services that are critical to business support for HQ customers. On-site support shall be provided during the prime time hours of 6:00 am until 6:00 pm Monday through Friday (except for holidays). During Non-Prime Time hours the contractor shall respond to the automated alerts, the Help Desk, or Government notification within 15 minutes. If the problem cannot be resolved remotely, arrive on-site within two hours of the initial notification.

To facilitate lifecycle management, virtualization, migration, debugging and sound business processes the contractor shall provision a continuous monitoring capability that enables ad-hoc views and analytics of the HQ service infrastructure. Servers and services within the HQ Data Center environments are monitored using through the use of automated tools that provide visibility in CPU, cache, I/O and other critical indicators that help determine use, availability, capacity and trends. The contractor shall support NASA in planning for and implementing changes to servers associated with determining the capacity and utilization of application servers and infrastructure servers.

The contractor shall:

- a. Conduct day-to-day operations, maintain and support system and application configuration. Ensure HQ Data Center software is in operating condition, current, with up to date maintenance, ensure that licensing and certificates on servers are renewed before expiration and security patches on applied on schedule.
- b. Determine and manage facility requirements including space allocation and assessments of power (redundant power with dual power feeds).
- c. The contractor shall conduct site surveys of each server rack prior to installing a server and verify that the rack has the necessary room, power, cooling and peripheral support required.
- d. Perform installation design, procure, and install equipment, and associated hardware and software to extend and/or enhance existing services. Perform configuration management of all data center hardware and supporting infrastructure, operating system software, as well as standard operating procedures (SOPs). Document and keep current physical and virtual server configurations in a System Description Document (SDD).
- e. Conduct regular audits of SDD and SOP documentation for accuracy and update as necessary.
- f. Notify ITCD of the need for outages or reduced services due to IT Security threats and/or incidents, investigation of anomalous behaviors, equipment failure, or other contingencies that cannot be scheduled.
- g. Provide planning, definition, design, security, development, acquisition, implementation maintenance and sustaining engineering support for new server systems or subsystems.
- h. Ensure that all CM documentation including diagrams, System Description Documents (SDDs), processes and procedures for the HQ Data Center environment devices and services is maintained and accurate.
- i. The contractor shall provide the Government with process improvement and efficiency recommendations and solutions as they relate to capacity planning, preventative maintenance, energy and space efficiency, power, cooling, virtualization, and automation.
- j. Support consolidation of services which includes planning, testing, license management, capacity planning, and installation of computer systems hardware and software, as necessary.
- k. Plan, engineer, integrate, and implement new capabilities and features to optimize and standardize workloads, meet customer requirements, and accommodate changes in technology.
- l. Deploy and maintain all servers in accordance with the operating system and application configuration benchmarks and Government approved standards.
- m. Develop, acquire, secure, sustain, operate, or recommend system service enhancements, upgrades, or new capabilities. Proposed implementations shall provide an integrated approach with respect to existing systems, other work in progress, and applicable policies, standards, and methodologies while maintaining optimum security and performance.
- n. Develop and implement acceptance testing to support installation of hardware systems, subsystems, components, peripherals, and interfaces.
- o. Perform system administration, log monitoring and reporting, problem identification and resolution, performance monitoring and reporting.

- p. Coordinate, support, and interface with Agency and other NASA Center systems and applications.
- q. Provide documentation to manage the data center (rack-elevation drawings, system shutdown procedures, emergency response procedures, etc.) and ensure the documents are up-to-date and readily available to authorized individuals.
- r. Coordinate hosting, relocation, enhancement and debugging activities with application development personnel, system administrators, the IT Security team, SE&I, Outreach, CM, and Help Desk, I³P contracts, and any other group or individual that may be impacted by a change or require Server Operations to support a change;
- s. Coordinate, support, and interface with Agency and other NASA Center systems and applications as necessary to maintain HQ managed services and Agency resources and services housed at HQ.
- t. Report identified security incidents to the NASA SOC in accordance with Federal and NASA requirements.
- u. In case of an actual or suspected security incident, provide all necessary support and access to incident responders, the NASA SOC and the affected systems personnel so that a detailed investigation can be conducted and lessons learned documented. Security logs and audit information shall be handled according to evidence preservation procedures.
- v. The contractor shall immediately report to the NASA SOC any known malicious activity or other suspected incident that negatively affects the confidentiality, integrity or availability of NASA information or IT resources. The contractor shall immediately report all losses of IT devices, electronic media, or NASA information in accordance with Agency and Center requirements.
- w. Provide on-call, continuous support and shall respond within 15 minutes to automated alerts and unplanned outage notifications. Arrive on-site, if necessary, within two hours of the initial notification with continuous effort until resolution.
- x. Ensure agreements that document, manage, audit, and modify Data Exchange Agreements are in place between and across all relevant systems within the HQ domain. The agreements will be living documents used to assess performance delivery and reused to extend service.
- y. Manage, install and maintain the performance monitoring and capacity planning tools.
- z. Monitor for software performance and capacity planning changes inclusive of CPU utilization, memory usage and notify the performance monitor accordingly.
- aa. Tune, adjust and modify systems and associated software for optimum performance within established security and ITCD governance processes.
- bb. Assess, with appropriate recommendations, the adequacy and effectiveness of solutions to hardware and/or software problems that are degrading computer system performance.

- cc. Monitor and manage server use utilization including when it requires the insertion of equipment or agents into discrete components, devices, or the operating systems in order to identify and isolate anomalous conditions.
- dd. Study trends, harvest and analyze data from existing management tool databases, develop new processes and procedures, and recommend innovations to ensure peak performance and availability of the service.
- ee. Monitor, manage and provide trending views of services with data exchange agreements to assess the frequency and success of exchanges between those services within the HQ Data Center environments.
- ff. Use structured and sound analytics to determine level of server use, peak use, and trends fact-based forecasts and modeling to assure levels of storage, memory, cache, and similar server subsystems are able to efficiently manage current services as well as determine capacity for growth or additional hosting requirements.

DRD	Description	Frequency
DRD 39-1-1	Availability of hosted and housed services	One month from contract start, monthly thereafter on or before the 20 th
DRD 39-1-2	Data Center Modernization Plan	One month from contract start, monthly thereafter on or before the 20 th
DRD 39-1-3	Equipment Upgrade Evaluation Report	One month from contract start, monthly thereafter on or before the 20 th
DRD 39-1-4	Spare Parts Inventory Report	Quarterly report every three months
DRD 39-1-5	Semi-Annual SDD Audit Report	Six months from contract start and semi-annually thereafter
DRD 38-1-6	Server consolidation and reduction report	One month from contract start date, monthly thereafter
DRD 39-1-7	A list of applications and services currently supported by the Data Center	One month from contract start, monthly thereafter on or before the 20 th

Metric #	Description	Metric
Metric 39-1-1	Systems and Applications Availability	> 99.95% Measurement: Monthly
Metric 39-1-2	Critical Application Availability	> 99.99% Critical applications uptime for the given reporting period

Metric 39-1-3	Application Incident Resolution. Measure the time to restore application (by Severity)	Max response time for application <70ms Measurement Tools: SolarWinds NPM and NetFlow Traffic Analyzer
Metric 39-1-4	Cloud Systems Availability. Cloud systems and services shall be available on a 24 X 7 X365 basis	≥ 99.5%
Metric 39-1-5	Production Servers Availability	> 99.95% uptime on an averaged 24/7 monthly basis. Measurement Tool: Solarwinds
Metric 39-1-6	Production NetApp storage Availability	> 99.95% uptime during core business hours for the given reporting period

39.2 Hardware and Systems Software Maintenance

The contractor shall be responsible for implementing the maintenance for all managed system hardware, software, and support equipment. The contractor shall provide technical support during normal business hours as well as outside of normal business hours. This support will be provided to the NASA Headquarters facility, HQ AWS MCE, and remote location at JPL, NMO. The contractor shall also be responsible for management of changes to form, fit or functions for all IT hardware and software services through the ITCD Change Management processes.

In performance of these services, the contractor shall:

- Provide engineering-related support for the server/appliance related operations and maintenance support services.
- Provide information for maintenance activities. Coordinate maintenance activities with the Government, other NASA Agency and other contractors.
- Conduct integration and security testing for all new and upgraded equipment, networks, software and services.
- Assess and communicate the overall impact and potential risk to service components prior to testing completion.
- Perform configuration management and change management activities related to integration and testing of change request (CR) and change management systems or services.
- Create, maintain and capturing all maintenance agreements and licenses and their period of coverage.
- Develop, document, and maintain in the SOPs, engineering procedures that meet requirements and adhere to defined policies.
- Develop and deliver engineering plans related to system Change Request (CRs).
- Perform engineering functions required to implement design plans for CRs.

- j. Prepare and submit status reports providing information on outages, such as component involved, period of downtime, and corrective actions in accordance with DRDs and additional reports as requested by ITCD.
- k. Provide a technical status report to the Government to include detailed failures reports, corrective actions taken, system documentation status, operational document status, maintenance performed during current month, maintenance scheduled for subsequent month, general system performance, general system condition, and any other issues or concerns.
- l. Prepare and submit a list of key contacts responsible for coordinating and conducting the required hardware and systems software maintenance functions.
- m. Maintain warranty protection and conditions for equipment in warranty.
- n. Maintain a complete, up-to-date, and accurate list of systems software licenses. Track and renew system software licenses in accordance with DRDs.
- o. Maintain up-to-date vendor documentation for all systems.
- p. Maintain vendor subscriptions describing and providing updates and enhancements.
- q. Maintain a complete, up-to-date, and accurate list of spare parts and related material necessary to maintain the equipment in accordance with DRDs.
- r. Ensure availability of parts for both maintenance and production functions.
- s. Maintain a real time, up-to-date service record for each system. The record shall include the date and type of equipment, service performed, list of parts used and costs, staff-hours utilized, and downtime, or time not available for use of equipment in accordance with DRDs.
- t. Maintain a complete, up-to-date, and accurate list of systems/hardware inventory.
- u. Acquire, test, and install systems software updates. Systems software tests and installations shall normally be performed during scheduled system test periods.
- v. Evaluate vendor-supplied updates or patches for applicability.
- w. Implement Government approved system software releases, patches, and updates.
- x. Maintain a working relationship with other NASA Centers necessary to obtain required items or maintenance in a timely manner.
- y. Maintain the maintenance tools, spares, procedures, and skills to perform the requirements of this PWS section

DRD	Description	Frequency
DRD 39-2-1	Quarterly/Monthly Patch Release Report	One month after contract start date, monthly thereafter
DRD 39-2-2	Report of Maintenance and Sustaining Engineering Plan	One month from contract start, monthly thereafter on or before the 20 th

DRD 39-2-3	Maintain software release matrices across development, and production environments and networks	Quarterly report every three months
DRD 39-2-4	Technical Status Report	One week from contract start

Metric #	Description	Metric
Metric 39-2-1	Compliance with Patch Management Plan. Data center servers shall be patched in accordance with the approved patch management plan and schedule	98% meet the criteria

39.3 Systems Administration

The Contractor shall perform system administration functions as delineated below for existing/established and future systems.

The Contractor shall:

- a. Maintain operating systems, and all software at the ITCD approved version, patch, and configurations necessary to ensure reliability and security of the HQ Data Centers computer systems.
- b. Operate and maintain all systems and services ensuring that all changes to the systems and services in the HQ Data Center Environments adhere to the ITCD governance and change management processes.
- c. Operate and maintain servers, peripherals, and to include system initializations and recoveries, storage and backup management.
- d. Provide security support in accordance with PWS Section 16, in particular with installation of patches to fix known vulnerabilities, and maintaining compliance with NASA HQ Security Policy and SOC bulletins.
- e. Provide account management documentation of users to include addition and deletion of user IDs, disk quotas, accounting and access control.
- f. Provide risk analysis and management to include continual identification and assessment of technical, schedule, cost, and organizational risks involved with the operation of systems in accordance with DRDs.
- g. Utilize the workflow process for system issue resolution, system enhancements, and new project implementations.
- h. Manage the utilization of high priority tasks and resource usage to support Headquarters projects and services as appropriate.
- i. Support cloud services with cloud providers (e.g., CSSO AWS GovCloud and AWS Public Cloud services to support IT services at NASA HQ) and to meet ITCD initiatives.

- j. Manage and maintain the ITCD automated system and service monitoring/alerting tool suite, ensuring all systems, devices, and services are configured in the monitoring tool.
- k. Provide, implementation, system testing, operations support, systems administration, and configuration management. This also includes, scheduling maintenance, problem resolution, system enhancements, and assist with new project implementations.
- l. Provide support during major events, patching / vulnerability corrective activities, system issues or scheduled customer requirements. This support may result in after hours, weekend, or holiday work where activities cannot be conducted during normal business hours due to unacceptable customer impacts.
- m. Perform regular and scheduled maintenance, which includes but is not limited to patches, upgrades, and performance tuning.

DRD	Description	Frequency
DRD 39-3-1	Quarterly/Monthly Patch Release Report	One month after contract start date, monthly thereafter
DRD 39-3-2	Security Reviews and Assessments	On demand
DRD 39-3-3	Risk Assessment	On demand

Metric #	Description	Metric
Metric 39-3-1	Patch Release Timeliness for Critical Vulnerabilities. Percentage of patches applied between patch availability and deployment for critical vulnerability systems (as defined by FIPS Publication 199)	> 99.95% Measurement: Monthly

39.4 Backup and Storage

The contractor shall perform regularly scheduled backups of servers and data storage devices in accordance with current SOPs.

The Contractor shall perform backup and storage functions, which include, but are not limited to the following:

- a. Provide, maintain and manage backups and restoration of all production systems and ITCD designated staging, testing, and development system (including all system files, file systems, directories, and/or user files).
- b. Ensure proper labeling and transport of backups to the NASA HQ designated off-site storage.
- c. Monitor backup systems to ensure all backup jobs successfully completed.

- d. Conduct quality assurance and process tests for the restoration process.
- e. Ensure backup SOPs are reviewed and updated as required to maintain accuracy and alignment with production technologies and processes.
- f. Provide, as needed, engineering/architectural services for existing and newly acquired backup and storage systems.

39.5 Continuity of Operations and Disaster Recovery

The contractor shall support NASA in developing and testing plans to ensure continuous availability of IT systems and services at systems located at HQ and also for systems located at other HQ Data Center environments. The contractor shall support the overall NASA Business Continuity processes by ensuring that required IT technical and service facilities (including computer systems, networks, applications, data repositories, telecommunications, environment, and technical support) operated by the contractor and supporting NASA HQ (and other NASA facilities as applicable) can be resumed within required business timeframes.

In support of Continuity of Operations (COOP) and Disaster Recovery (DR), the Contractor shall:

- a. Communicate Continuity of Operations and Disaster Recovery plans of action to customers for any events or declared disasters that may impact the delivery of services in accordance with the ITCD BCP and COOP plans.
- b. Document the strategic approach to coordinate the return to service of critical Center applications at the DR site or location specified by ITCD.
- c. Document the strategic approach to coordinate return to service for the Agency applications at the DR site or location specified by ITCD to meet the Recovery Point Objective (RPO) and Recovery Time Objectives (RTO) as documented in the COOP/Disaster Recovery Plan.
- d. Participate in annual exercises for COOP/BCP and DR.

39.6 Physical Control Support

Because of the sensitivity of the systems and services within the Data Center, and because of the potential damage that could be done by an individual who has physical access to the hardware and network within it, the NASA HQ Data Center has restricted access which shall be vigorously maintained by the HITTS contractor.

The contractor shall:

- a. Monitor the physical security of the HQ Data Center and all sensitive unclassified automated information resources within the HQ Data Center;
- b. Work closely with HQ Security to control HQ Data Center access provided to contractor and subcontractor personnel;
- c. Comply with the policies and procedures for HQ Data Center physical security in accordance with established procedures; and

- d. Maintain server racks, server facilities and telecommunications closets in a clean, safe, and well organized way.

39.7 Environmental Control Support

The NASA HQ Facilities and Administrative Services Division (FASD) is primarily responsible for provisioning the environmental systems and power that support the HQ Data Center, however co-monitoring and coordination is critical to the safe operations of the HQ Data Center. The contractor shall continually monitor the environmental conditions of the HQ Data Center. The contractor shall immediately report all anomalous conditions to ITCD and to FASD. The contractor shall maintain a verified call and escalation list.

39.8 Account Administration

NASA has implemented the NASA Account Management System (NAMS), as part of NEACC (NASA Enterprise Applications Competency Center). Currently, NASA HQ new system, service, new application account requests, changes and deletions are processed through NAMS. HQ Account Administration staff receives notification from NAMS when all the required approvals have been made for account requests and proceeds with provisioning the approved access or removal of access.

Among the responsibilities for account management, the contractor shall:

- a. Maintain up-to-date procedures for coordinating with IT Security, ESD, NAMS and others for account creation, modification and deletion.
- b. Provision password resets for local applications via the ESD processes.
- c. Provision, modify, and remove user accounts for HITSS supported applications, systems and services.
- d. Support modifications to process and provide support to meet future NASA account services; and
- e. Adhere and comply with applicable regulations and policies (e.g., HSPD-12, NPR 2810, and NASA PKI Registration Authority).

40.0 Computer and Mobile Device Services and Support

The contractor shall be required to provide components of computer and mobile device services not offered, managed, developed, implemented, and/or maintained by existing enterprise service provider(s) in accordance to NASA HQ and NASA HQ ITCD requirements, required/requested service level agreements, operational level agreements, service capacity, and service demands. The contractor shall provide augmentation of services and support to address gaps and/or requirements not covered in existing enterprise services.

The contractor shall ensure integration of services and support provided with enterprises services to ensure compatibility with NASA requirements, standards, required configurations, etc. The contractor shall develop, implement, execute, and manage a test management plan, configuration management plan, change management plan, communications plan, impact analysis plan, risk management plan, service integration plan, and other plans, agreements, and related documents as required and requested for service and support management. HQ ITCD requires inventory management and data capture of all related configuration items associated with desktop services and support provided across HQ. The contractor shall store, track, manage, maintain configuration items and related data attributes, plans, and artifacts with a technical solution provided by NASA HQ ITCD and/or developed and by the contractor and hosted in a NASA hosting environment. HQ ITCD requires that accuracy, integrity, and maintenance of configuration items such as (but not limited to) artifacts, assets, products, etc. be executed, practiced, and managed in accordance with HQ ITCD, NASA, federal, and industry standards, and policies.

The range of services and support that the contractor shall provide and/or augment are (but not limited to) the following:

- a. Provide project management for upgrades and changes to the hardware and software products for computers (such as desktops and laptops), tablets, mobile devices, peripheral devices (such as but not limited, storage devices/media), equipment, etc;
- b. Review and as directed provide augmented communication and training for upgrades and changes to the hardware and software products for computers (such as desktops and laptops), tablets, mobile devices, peripheral devices (such as but not limited, storage devices/media), equipment, etc;
- c. Provide support for the reconciliation and correction of the ESD/ServiceNow inventory and asset management system;
- d. Provide services associated with asset management of the hardware and software products for computers (such as desktops and laptops), tablets, mobile devices, peripheral devices (such as but not limited, storage devices/media), equipment, etc;
- e. Provide operability testing, IT Security reviews, software and license management, patching, and installation of software that is beyond the scope of the ACES Gold Build;
- f. Maintain an up to date and accurate inventory of all end user computer (desktop and laptop) software that is beyond the scope of the ACES Gold build installed on HQ computers;
- g. Provide services associated with the management of end user computer (desktop and laptop) software that is beyond the scope of the ACES Gold build installed on HQ computers for the purpose of recovery and reassignment of software licenses associated with decommissioned computing seats;
- h. Provide a software library service for the management and reallocation of software licenses recovered as a result of decommissioned compute seats or user requested software removals;
- i. Provide software reinstallation support due to ACES seat refreshes or failure recovery;

- j. Provide end user level and system support for new technologies, devices, and systems that are outside of the service offerings on Agency wide contracts;
- k. Utilizing Government provided software tools provide as requested reports for end user computing device hardware and software versions and attributes

DRD	Description	Frequency
DRD 40-0-1	Software library inventory report to include allocated and available software licenses	30 days after contract start
DRD 40-0-2	Annual audit of software license report	2 months after contract start, annually thereafter
DRD 40-0-3	Software library license management plan	2 months after contract start, annual updates thereafter
DRD 40-0-4	SOP for Software library operations	2 months after contract start, annual updates thereafter

The contractor shall assist NASA HQ ITCD with defining, establishing, collecting, and analyzing metrics on all services and support required under Computer and Mobile Device Services and Support. The contractor may be required to integrate NASA HQ ITCD systems used to manage Computer and Mobile Device Services and Support with other NASA systems.

Metric #	Description	Metric
Metric 40-0-1	Annual audit of software license report	The annual audit will maintain 98% accuracy

Metric #	Description	Metric
Metric 40-0-2	Above ACES gold build software shall be installed and operable on the customer's computer within 7 business days of request	The contractor shall deploy 90% with no defects within 7 business days of request

Additionally, the contractor shall not promote Computer and Mobile Device Services and Support configuration items to production, to baseline status, active status, etc. without HQ ITCD or NASA approval via the HQ ITCD and NASA governance entities/mechanisms.

41.0 Desktop Services and Support

The contractor shall provide components of desktop services not offered, managed, developed, implemented, and/or maintained by existing enterprise service provider(s) in accordance to NASA HQ and NASA HQ ITCD requirements, required/requested service level agreements, operational level agreements, service capacity, and service demands. The contractor shall provide augmentation of services and support to address gaps and/or new requirements not offered in existing enterprise services. Initially, the contractor shall provide services and support for desktop services not offered/provisioned, supported, maintained, etc. by enterprise service providers. Augmentation of other services and support needed will be activated by NASA HQ on an as-needed basis. The contractor shall provide augmentation of services and/or support in October 2018 unless otherwise required by NASA HQ.

The range of services and support that the contractor shall provide and/or augment are (but not limited to) the following:

- a. Providing computers (such as desktops and laptops), tablets, mobile devices, peripheral devices (such as but not limited storage devices/media), equipment, etc.
- b. Establishing and managing a loaner pool (as well as related support and services) for computers, tablets, mobile devices, peripheral devices, equipment, etc.
- c. Remote and onsite help and support of computers, tablets, mobile devices, peripheral devices, equipment, etc.
- d. Manage end of life and end of technology for computers, tablets, mobile devices, peripheral devices, equipment, etc. Provide refreshes for computers, tablets, mobile devices, peripheral devices, equipment, etc.
- e. Encryption of computers, tablets, mobile devices, peripheral devices, equipment, etc.
- f. Operating systems and other software related to computer, tablet, mobile device, peripheral device, and equipment configuration, imaging, etc.
- g. Warranty and maintenance services related to desktop management and support

- h. Contract and service agreement management related to desktop management and support
- i. Purchasing and leasing services for computer, tablet, and mobile device bundles
- j. Computer, tablet, mobile device, peripheral device, etc. configurations, installations, management, and maintenance services
- k. Provide and manage supplies for computers, tablets, mobile devices, peripheral devices, etc.
- l. Tag assets and perform asset management of computers, tablets, mobile devices, peripheral devices, etc.
- m. Establish a financial management and project management system for computers, mobile devices, etc
- n. Client deployments, upgrades, management, and maintenance services
- o. Browser deployments, upgrades, management, and maintenance services
- p. Operating system deployments, upgrades, management, and maintenance services
- q. Desktop encryption deployments, upgrades, management, and maintenance services
- r. Utility software deployments, upgrades, management, and maintenance services
- s. Communication software deployments, upgrades, management, and maintenance services
- t. Desktop images/builds and configurations development, installations, management, and maintenance services
- u. Leasing services for more robust configurations, deployments, management, and maintenance of software, operating systems, browser, etc. upgrades and maintenance.
- v. Pre-refresh, pre-deployment, pre-provisioning configuration and testing of computers, tablets, mobile devices, peripherals, printers, storage devices, etc.
- w. Backup, archive, storage services for computers, tablets, mobile devices, peripherals, etc.
- x. Virtualization of desktops and printer services
- y. Data storage solutions
- z. Service bundles for customized desktop solutions
- aa. Remote and on-site help and support
- bb. Automated deployments and upgrades
- cc. Development and delivery of end user training and educational material and courses for end user computing device, mobile device, and peripherals to augment Enterprise provisioned systems and services
- dd. Project Management and Release Management support for Enterprise projects and initiatives

The contractor shall ensure integration of services and support provided with enterprises services to ensure technical solutions, services, and support compatible with NASA requirements, standards, required configurations, etc. The contractor shall develop, implement, execute, and manage a test management plan, configuration management plan, change management plan, communications plan, impact analysis plan, risk management plan, service integration plan, and other plans, agreements, and related documents as required and requested for service and support management. HQ ITCD requires inventory management and data capture of all related configuration items associated with desktop services and support provided by the contractor. The contractor shall store, track, manage, maintain configuration items and related data attributes, plans, and artifacts with a technical solution provided by

NASA HQ ITCD and/or developed and by the contractor and hosted in a NASA hosting environment. HQ ITCD requires that accuracy, integrity, and maintenance of configuration items such as (but not limited to) artifacts, assets, products, etc. be executed, practiced, and managed in accordance with HQ ITCD, NASA, federal, and industry standards, and policies.

DRD	Description	Frequency
DRD 41-0-1	Technical Solution for Configuration Management of Desktop Service Configuration Items	Within 60 days of activation of services and support
DRD 41-0-2	Configuration Management Plan, SOP, and Processes	Due first 60 days after activation of services and support; Quarterly thereafter or more frequently per ITCD request
DRD 41-0-3	Desktop Services and Support Program and Project Management SOP	Due first 60 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-4	Desktop Services and Support Model (for activated and required services and support)	Due first 60 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-5	Services and Support Integration Model and Contract Operational Agreements (with enterprise service providers/services)	Due first 30 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-6	Financial System for Desktop Services and Support	Due first 60 days after activation of services and support.
DRD 41-0-7	Test Management Plan and SOP	Due first 30 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-8	Change Management Plan and SOP	Due first 30 days after activation of services and support; Quarterly

DRD	Description	Frequency
		thereafter (or more frequently upon ITCD request)
DRD 41-0-9	Communications Plan and SOP	Due first 30 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-10	Impact Analysis Plan and SOP	Due first 30 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-11	Risk Management Plan and SOP	Due first 30 days after activation of services and support; Quarterly thereafter (or more frequently upon ITCD request)
DRD 41-0-12	Risk Mitigation Plan	Ongoing
DRD 41-0-13	Other Desktop Services and Support Documents and Deliverables - Placeholder	As requested after activation of services and support
DRD 41-0-14	Service Improvement Plan and Corrective Action Reports	As requested after activation of services and support
DRD 41-0-15	Placeholder for Future DRD which may be added via contract modification	TBD
DRD 41-0-16	Placeholder for Future DRD which may be added via contract modification	TBD

The contractor shall assist NASA HQ ITCD with defining, establishing, collecting, and analyzing metrics on all services and support required under Desktop Services and Support. The contractor may be required to integrate NASA HQ ITCD systems used to manage Desktop Services and Support with other NASA systems.

Service Level Agreement #	Description	SLA
Service Level Agreement 41-0-1	Accuracy of configuration management data, information, and reporting	Configuration Management data, information, and reporting shall be 99% accurate
Service Level Agreement 41-0-2	Desktop Services and Support Management Metrics	<ul style="list-style-type: none"> • All changes shall be entered into the configuration management system and tools supporting configuration management • All changes recorded shall contain accurate information

Metric #	Description	SLA Metric
Metric 41-0-1	Accurate execution of the desktop services and support management processes, and procedures	The contractor shall maintain 100% compliance with the NASA requirements, standards, and policies relevant to the maintenance of desktop services and support
Metric 41-0-2	Desktop Images	The contractor shall deploy 99% of desktop image with no defects
Metric 41-0-3	Computer, mobile device, peripheral device tablet, etc. deployments and refreshes	The contractor shall deploy 99% of desktop image with no defects

Additional service level agreements and metrics may be established after activation of desktop services and support. The contractor shall perform services and support according to all service level agreements and metrics established.

Additionally, the contractor shall not promote Desktop Services and Support configuration items to production, to baseline status, active status, etc. without HQ ITCD or NASA approval via the HQ ITCD and NASA governance entities/mechanisms.

42.0 IT Catalog Service

The contractor shall provide a full catalog of commercial IT components for ordering on the first business day of the contract. Each catalog entry shall clearly define, in precise and understandable terms, what hardware, software, service, coverage, warrantee, support, etc., is included in the catalog price. The catalog provided shall be on a commercial web-site with government pricing (e.g., pcmallgov.com; gtsi.com; cdwg.com, etc.) and shall meet all FAR requirements. The catalog provided shall allow alternate shipping methods. All NASA Headquarters employees may order from the catalog. All items ordered for Government use shall be approved in the following sequence, first by the organization IT POC, then the organization budget official, and lastly the IT and Communications Division point of contract. The Contractor shall be responsible for delivery and when required, for installation of the product. The Contractor shall be responsible for returning to the catalog vendor all or some portion of orders as required. For catalog items, the Contractor has no responsibility for integration into the customer's environment, consultation services, training, or data conversion. If the product cannot be installed without causing anomalies with the customer's computer, then the product shall be removed and the customer's computer shall be restored to its original state. If problems occur after the installation that can reasonably be traced to the product, then the product shall be removed and the customer's system shall be restored to its original state. The catalog shall contain a disclaimer for each item that clearly limits the Contractor responsibility. The Government shall approve items and categories of items placed into the catalog.

Products and licenses that are available through the Agency ELMT program shall not be procured through this catalog service.

DRD	Description	Frequency
DRD 42-0-1	Catalog Orders Report/Checkbook includes number of orders by category, requisition number and funding source (if known), number complete, funds used versus available, funds in process, summary total of monthly catalog invoice and break out of ITCD funded monthly total.	2 weeks after contract start, monthly thereafter.

43.0 Reserved

44.0 CYBERSECURITY AND INFORMATION SECURITY SERVICES

NASA Headquarters has established a strategic approach to the management of cybersecurity and information security that supports NASA's cybersecurity strategy and provides the ability to consolidate and standardize common security functions and capabilities as a set of unified and consistent service throughout their life cycle. The contractor shall implement and manage a single end-to-end security provisioning organization that can develop, implement and operate cybersecurity and information security service for all HQ Offices, Mission Directorates, and organizations.

44.1 Threat and Vulnerability Management Services

The contractor shall perform threat and vulnerability management services, as described in the following sections of this PWS.

In support of the HQ Chief Information Security Officer (CISO) and Chief Information Officer (CIO), the contractor shall perform tracking of all risks identified as a result of threat and vulnerability monitoring and assessment activities.

The contractor shall:

- a. Use NASA standard solutions and procedures, where available;
- b. Review risk mitigation actions (including remediation, risk acceptance, risk transfer, or identification of false positives) to ensure that all identified risks are being addressed, review appropriateness of responses and timelines, and assess effectiveness of such actions for mitigating the identified risk;
- c. Review Plans of Actions and Milestones for timely completion of mitigation actions;
- d. Provide all results to the Center CISO, NASA SAISO, and other NASA personnel, as appropriate.

For any deviations from NASA policies observed while conducting normal duties, the contractor shall report such deviations to the cognizant NASA official. If an observed deviation is thought to be a malicious activity that affects the integrity, confidentiality or availability of NASA information or information systems, it shall be considered a security incident and immediately reported to the NASA Security Operations Center (SOC).

DRD	Description	Frequency
DRD 44-1-1	Vulnerability reports	Upon request

44.1.1 Threat and Vulnerability Monitoring and Communication

The contractor shall perform proactive threat and vulnerability monitoring to identify potential and actual threats to all devices, IT assets, and NASA information within the scope of this PWS, to identify vulnerabilities which could make NASA assets susceptible to potential and actual threats, and to detect intrusions into NASA's IT environment. Intrusion detection is defined as the full range of activities aimed at detecting attempts to compromise the confidentiality, integrity or availability of NASA's network and information resources. This includes, but is not limited to, examining network traffic, log files or other evidence for signs of intrusions. The contractor shall communicate all relevant findings to NASA security personnel, information system owners, and other IT personnel, as needed to ensure that threats and vulnerabilities can be mitigated to the greatest extent possible.

The contractor shall:

- a. Review and analyze threat and vulnerability alert information from the NASA SOC, Government threat and vulnerability information forums, industry and vendor alerts, hacker boards and other sources
- b. Develop recommendations for mitigation of identified security threats and vulnerabilities, to include:
 - i. Timelines for mitigation, based on a NASA-specific risk analysis, which takes into account severity ratings of threats and vulnerabilities, mitigating or exacerbating conditions, prevalence of particular vulnerabilities, NASA's environment, etc.
 - ii. Specific vendor patches
 - iii. Configuration changes
 - iv. Changes to network or system architecture;
 - v. Other changes or security measures
- c. Ensure that threat and vulnerability information is communicated to all relevant NASA security personnel, information system owners, and other IT personnel who have the responsibility for tracking and updating assets that have been identified as vulnerable. Communication mechanisms could include a secure website for reporting and tracking threats and vulnerabilities, or other automated solutions to ensure appropriate distribution, maintenance and tracking of such information;
- d. Where NASA standard solutions are available, utilize such NASA solutions for recording, tracking, reporting, and communicating threat and vulnerability information
- e. As requested by NASA, work with other Government and industry organizations to obtain and share threat and vulnerability information

- f. Manage NASA vulnerability waiver processes for HQ, in accordance with NASA policy and procedures
- g. As needed as a result of identified threats, vulnerabilities, misconfigurations, malicious activity, or changes in the environment, work with NASA and the appropriate operations personnel to modify firewall rule sets, proxy rule sets, IDS or IPS signatures, etc., to address security issues, in accordance with Federal and NASA policies and standards and with relevant IT operations procedures.
- h. For any new security tools or solutions, work with NASA and the relevant operations personnel to develop appropriate baseline configurations, rules and signatures to allow for optimal monitoring, intrusion detection and/or prevention for the NASA environment.

DRD	Description	Frequency
DRD 44-1-1-1	Recommendations for addressing identified vulnerabilities	As needed
DRD 44-1-1-2	Security monitoring configurations, rules and signatures	Ongoing

44.1.2 Network Vulnerability Scanning

The contractor shall detect and monitor IT vulnerabilities in accordance with NASA policies and procedures, and will report findings using NASA-approved methods, systems and formats. The contractor shall:

- a. Conduct and document network vulnerability scanning in accordance with NASA policies, procedures and other guidance provided by the Agency;
- b. Use the NASA approved scanning tool(s) and profiles;
- c. Conduct network vulnerability scans at a frequency that is sufficient to ensure that the current state of vulnerabilities is well understood, but no less than the frequency required by NASA policy and procedures;
- d. Conduct scheduled non-credentialed network vulnerability scans;
- e. Conduct scheduled credentialed network vulnerability scans. The contractor shall work with the appropriate information system owners and services providers to obtain the necessary credentials to successfully perform such scans;
- f. Conduct ad-hoc network vulnerability scans, non-credentialed or credentialed, as requested by information system owners, ISSOs or other system personnel, or as needed to validate mitigation of previously identified vulnerabilities;
- g. Ensure that the results of all network vulnerability scans are transferred electronically, using NASA standard tools and processes, and at a frequency that meets NASA requirements, to the NASA authoritative security risk management repository;

- h. Work with information systems owners, ISSOs, and system administrators to ensure awareness and understanding of identified vulnerabilities by system personnel.

Metric #	Description	SLA Metric
Metric 44-1-2-1	Network vulnerability scanning is conducted at a frequency that is compliant with NASA vulnerability scanning policies/procedures	90% of NASA-required regularly scheduled network vulnerability scans are conducted annually

44.1.3 Host Security Monitoring

The contractor shall perform host security monitoring to identify activity or changes on NASA computers which could be indicative of malicious activity, malware, misconfiguration or other security threats or vulnerabilities. The contractor shall:

- a. Use all NASA-approved data sources available for such monitoring, including, for example, system or application logs, host-based malware protection solutions, host-based intrusion detection systems, etc.;
- b. Provide all findings to appropriate NASA security personnel;
- c. Work with information systems owners, ISSOs, and system administrators to ensure awareness and understanding of identified threats and vulnerabilities by system personnel
- d. In case of an actual or suspected security incident, provide all necessary support and access to incident responders, the NASA SOC and the affected systems personnel so that a detailed investigation can be conducted and lessons learned documented. Security logs and audit information will be handled according to evidence preservation procedures.
- e. Provide requested information to authorized recipients within NASA security and law enforcement agencies as requested to support investigations, audits, personnel actions, and legal proceedings.

44.1.4 Network Security Monitoring

The contractor shall perform network security monitoring to identify network traffic which could be indicative of malicious activity, misconfigurations or other security threats or vulnerabilities. The contractor shall:

- a. Review and analyze information from Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS), firewall logs, system and application logs, security scanners, malware protection solutions, Web content filtering or proxy solutions, asset management solutions, other network monitoring tool logs and other NASA data sources, to identify potential and actual threats and vulnerabilities.
- b. Provide results to the appropriate Government security personnel. Report identified security incidents to the NASA SOC in accordance with Federal and NASA requirements.
- c. In case of an actual or suspected security incident, provide all necessary support and access to incident responders, the NASA SOC and the affected systems personnel so that a detailed

investigation can be conducted and lessons learned documented. Security logs and audit information will be handled according to evidence preservation procedures.

- d. Provide requested information to authorized recipients within NASA security and law enforcement agencies as requested to support investigations, audits, personnel actions, and legal proceedings.
- e. Conduct wireless 802.11 scanning, at least quarterly or in accordance with NASA requirements to discover unauthorized wireless systems which are on or near the HQ wireless network; analyze the results of this scanning; and submit a report for each scanning activity, which identifies all detected authorized and all detected unauthorized network access points or wireless systems.

DRD	Description	Frequency
DRD 44-1-4-1	Report of wireless 802.11 scanning	Quarterly

44.1.5 Ad-Hoc Security Review and Scanning

As requested by NASA, the contractor shall perform ad-hoc security review and scanning. For example, the contractor shall:

- a. Conduct security scans of devices (laptops, thumb drives, or other removable media, etc.) that are not covered under an authorized NASA system security plan (SSP), or that have been outside of the security perimeter of an authorized NASA SSP to determine whether they meet Agency and Center/facility requirements for connection to NASA information systems, connection to a NASA private network, or insertion into NASA devices. These devices may belong to other contractors supporting NASA HQ or NASA issued devices from another Center. Scans shall be as needed and may need to be conducted on short notice.
- b. Provide the results of ad-hoc security reviews and scans to NASA requestors and the cognizant Center CISO as requested by NASA.

DRD	Description	Frequency
DRD 44-1-5-1	Results of ad-hoc security review/scan	As requested

44.1.6 Penetration Testing

The contractor shall conduct penetration testing of networks and information systems, annually or as requested by the HQ CISO.

Penetration testing shall include comprehensive internal and external network penetration testing. Internal testing will be conducted from within the Center user network and external testing shall be conducted from a contractor facility to view the Center from a true external Internet perspective. Additional penetration testing activities may include Social Engineering (e.g. Phishing, “dumpster diving”, help desk calls, etc.) and wireless security assessments to identify “rogue” wireless access

points within NASA facilities. Penetration testing may include attack simulations, running automated scanning tools, or conducting physical inspections. The scope of each penetration test shall be agreed upon in conjunction with NASA. The contractor shall:

- a. Schedule all penetration tests in coordination with the HQ CISO
- b. Prepare proposed Rules of Engagement, a Penetration Test Plan, and a comprehensive schedule outlining activities and anticipated man hours for approval prior to beginning the test
- c. Provide daily status of test activities and findings to the HQ CISO or NASA personnel designated by the COR
- d. Deliver a comprehensive test report describing the penetration test, methods, results, vulnerabilities, and recommendations for corrective actions and improvements

The contractor shall conduct incident response (IR) assessment penetration tests, as requested by NASA, whereby NASA incident response capabilities shall be tested externally, with no pre-announcement of the testing. For such IR assessment penetration tests, the contractor shall develop a test methodology that will enable assessment of the Center's ability to detect the testing activity, and then to further assess the reaction and response to the activity. After each IR assessment penetration testing event, the contractor shall deliver a comprehensive test report describing penetration test, methods, results, lessons learned and recommendations for improvements in the Center's IR technologies and procedures.

DRD	Description	Frequency
DRD 44-1-6-1	Rules of Engagement for penetration testing	Prior to commencement of penetration testing activities
DRD 44-1-6-2	Penetration test plan and schedule	Prior to commencement of penetration testing activities
DRD 44-1-6-3	Penetration testing report	Within 30 days of completion of penetration testing activities

44.2 Asset Security Management Services

The contractor shall perform asset security management services in support of the HQ CISO and CIO, as described in the following sections of this PWS.

44.2.1 Asset Inventory Support (SWAM, HWAM)

The contractor shall support NASA in performing hardware asset management and software asset management of all computers and other electronic devices owned and/or managed by NASA or which access NASA networks. The contractor shall support NASA's ability to ensure that all such devices are authorized, appropriately documented in information system inventories, and that someone is assigned to manage each device. The contractor shall support NASA's ability to ensure that software and software versions on all devices are authorized, appropriately configured, and appropriately documented.

44.2.2 Security Configuration Baseline Development and Maintenance

The contractor shall review and implement the configuration guidelines for securely configured computer systems and applications in multiple environments, to include, for example, Windows, MacOS, UNIX, and mobile device platforms as defined by ETADS/ASUS. For systems outside the scope of ETADS/ESUS the contractor shall define rerequisites and develop configuration guidelines. The contractor shall:

- a. Develop and document security configuration baselines for all operating systems and applications, as requested by NASA, which shall meet the requirements of Federal and NASA policy and guidance, shall be consistent with security best practices, shall enable and support NASA mission requirements, and shall meet NASA risk management criteria.
- b. Review Federal and NASA requirements and guidance, vendor recommendations and industry best practice to determine an appropriate security configuration baseline for each applicable operating system or application;
- c. Conduct testing of proposed security configuration settings to ensure that these settings meet all requirements, and that they do not unduly hinder NASA mission requirements;
- d. Document security configuration baselines and make them available to all information system personnel that need them;
- e. Review and update security configuration baselines, as needed but no less than annually;
- f. Ensure that automated monitoring content, where feasible, and consistent with the Security Content Automation Protocol (SCAP) is available for monitoring the current versions of all security configuration baselines within the scope of this PWS.

DRD	Description	Frequency
DRD 44-2-2-1	Updated security configuration baselines for NASA operating systems and application	Annually, for operating systems/applications requested by NASA

44.2.3 Security Configuration Monitoring

The contractor shall monitor security configurations of all relevant devices and application, and report security configuration status in relation to the relevant security configuration baselines. The contractor shall:

- a. Use the NASA approved monitoring tools, SCAP monitoring content, and processes;
- b. Evaluate the identified security configuration settings against the relevant NASA security configuration baseline;
- c. Ensure that the results of all security configuration monitoring are transferred electronically, using NASA standard tools and processes, and at a frequency that meets NASA requirements, to the NASA authoritative security risk management repository;

- d. Work with information systems owners, ISSOs, and system administrators to ensure awareness and understanding by system personnel of identified deviations from security configuration baselines.

44.3 Application Security Services

In support of the HQ CISO and CIO, the contractor shall assist NASA HQ to enhance the security of web-based applications and other applications by assessing the security of applications through scanning, penetration testing, and/or source code review, by identifying threats to applications, and by providing training, and other resources to application developers.

44.3.1 Application security assessment

The contractor shall configure and conduct automated, ad-hoc, and in-depth security assessments of NASA HQ web applications and applications developed on behalf of or used by NASA. The contractor shall:

- a. Use NASA standard scanning and review tools and processes, where available;
- b. As part of NASA's application SDLC, evaluate and report on the security of any new web applications or web applications that have been modified, by using application security scanning, manual testing, source code review, etc. as appropriate;
- c. Regularly perform network scans to evaluate the security of all Internet accessible NASA web applications within scope of this PWS, on a frequency determined by NASA;
- d. Regularly perform network scans to evaluate the security of all non-Internet accessible NASA web applications within scope of this PWS, on a frequency determined by NASA;
- e. Conduct in-depth testing of NASA web applications (by using application security scanning, manual testing, source code review, etc., as appropriate) as requested by NASA, for example, for Internet-facing applications that contain sensitive information;
- f. Assess, validate, and provide remediation recommendations, consistent with NASA policy, for all critical, high and medium risk security findings that have been identified;
- g. Ensure that the results of all web application security scans are transferred electronically, using NASA standard tools and processes, and at a frequency that meets NASA requirements, to the NASA authoritative security risk management repository;
- h. Work with application owners, ISSOs, and system administrators to ensure awareness and understanding by relevant personnel of identified application security vulnerabilities or deviations from NASA application security standards.

DRD	Description	Frequency
DRD 44-3-1-1	Application security review reports	As requested

44.3.2 Secure coding standards, practices and training

The contractor shall use industry standards and subject matter expertise to identify, develop, and document security coding best practices to be used for, and security requirements to be met by, NASA applications. The contractor shall develop and provide training to developers of NASA applications on such secure coding standards and best practices.

DRD	Description	Frequency
DRD 44-3-2-1	Training materials on secure coding standards and best practices	As requested

44.3.3 Secure code repository

The contractor shall assist HQ in identifying, compiling and/or developing repositories of secure code that may be used in developing or improving NASA applications. Any developed repository shall be scalable and flexible to accommodate HQ's current and future development frameworks and codebase, and to incorporate changes in secure coding practices.

44.4 Security Incident Management Services

In support of the HQ CISO and CIO, The contractor shall provide the full range of security incident management and response services as described in the following sections.

44.4.1 Center/Organization Security Incident Management

The contractor shall:

- Staff and operate the HQ Incident Response Team (IRT) to respond to, investigate, document and resolve cybersecurity and information security incidents in accordance with NASA policies and procedures and any local security incident response procedures.
- Support the expeditious and effective acknowledgement, identification, investigation and mitigation of IT Security incidents.
- At least twice daily on all business days, review security incident tickets in the IMS for tickets assigned to the Center/organization.
- For all IMS tickets assigned to the Center/organization, initiate appropriate action and document such action in the IMS within one business day, or within 24 hours for tickets associated with an after-hours call down.
- During non-Core Business hours, respond to a NASA SOC call down or other Government phone notification within 30 minutes by email, phone call or update to the NASA security

Incident Management System (IMS). Arrive on-site, if required, within four hours of the Government's request for on-site services.

- f. Ensure that all IMS tickets assigned to the Center/organization are processed and closed in a timely manner, in accordance with NASA policy and local incident response procedures.
- g. Annually, conduct incident response training and conduct an incident response exercise in accordance with NASA policies and procedures.
- h. Coordinate and communicate incident management activities with the NASA SOC and other Center IRTs, as needed, to ensure an Agency-wide understanding and collaboration regarding incidents that may affect multiple NASA sites or systems.

DRD	Description	Frequency
DRD 44-4-1-1	Incident Response Training Materials	Annually

Metric #	Description	Metric
Metric 44-4-1-1	During non-Core Business hours, respond to all SOC call downs or other Government phone notifications of security incidents within 30 minutes	All but 1 instance per year meet the requirement
Metric 44-4-1-2	During non-Core Business hours, arrive on-site within four hours of a Government request for on-site security incident management services	All but 1 instance per year meet the requirement
Metric 44-4-1-3	For all IMS tickets assigned to the Center/organization, appropriate action is initiated and documented in IMS within one business day, or within 24 hours for tickets associated with an after-hours call down	Meet the requirement for 95% of IMS tickets per year

44.4.2 Incident reporting

The contractor shall immediately report to the NASA SOC, and other organizations such as the United States Computer Emergency Readiness Team (US-CERT), as required, any known malicious activity or other suspected incident that negatively affects the confidentiality, integrity or availability of NASA information or IT resources. The contractor shall immediately report all losses of IT devices, electronic media, or NASA information in accordance with Agency and Center requirements.

44.4.3 Digital Forensics

In support of security incident investigations, e-Discovery requests, or other authorized requests from NASA officials, the contractor shall perform forensic analysis on computers, mobile devices and other

electronic media. The purpose of such analysis may include, but is not limited to, determination of facts and timelines of activities involving the device or media, analysis of compromise activity, discovery of indicators of suspected or actual compromise, discovery and retrieval of requested information, etc.

44.4.4 Malware Analysis

In the context of security incidents, NASA systems are sometimes subjected to malware, or malicious software which may disrupt computer operations, gather sensitive information, gain unauthorized IT access, or perform other unauthorized actions. The contractor may be requested to perform malware analysis, potentially to determine the origins of the malware, its intended or actual operation, and/or the impact caused by the malware. The contractor shall have the requisite subject matter knowledge and expertise to perform malware analysis at NASA's request. For any such analysis, the contractor shall provide a report of the findings of the analysis.

DRD	Description	Frequency
DRD 44-4-4-1	Malware analysis reports	As requested

44.4.5 Media Sanitization Support

The contractor shall have the capability to provide media sanitization services as requested by NASA.

The contractor shall develop and implement procedures that ensure IT resources leaving control of an assigned user (e.g., the resource is being reassigned, repaired, replaced or excessed) have all NASA data and sensitive application software removed by a NASA approved technique. Applications on the device that were acquired via a "site license" or "server license" shall be removed prior to resources leaving the control of NASA. Damaged IT storage media for which data recovery is not possible shall be degaussed by a NASA approved technique or destroyed. All sanitization shall meet the requirements of NASA policies and procedures.

DRD	Description	Frequency
DRD 44-4-5-1	Media sanitization procedures	Within 120 days of award, updated annually or as requested

44.4.6 E-Discovery Support

The contractor shall support e-discovery activities, forensic imaging, and forensic examination of user workstations, email mailboxes, user files, removable media and other IT devices, as requested by authorized personnel. Such requests will usually be made by the cognizant NASA Center CISO or other authorized personnel on behalf of representatives from Human Resources (HR), Office of Inspector General (OIG), Office of General Counsel (OGC) and other organizations. These activities may be in

support of Freedom of Information Act (FOIA) requests, Congressional requests or other external requests.

The contractor shall download and parse user e-mail data from the NASA Operational Messaging and Directory (NOMAD) email service, the NASA repository for senior Agency officials' email records, backups of users' data, or copies of user e-mail files. Upon request, the contractor shall retrieve user mailbox files from user workstations, either with or without coordination with the user, as directed by the requestor and the cognizant NASA Center CISO. The contractor shall electronically index and search the records based on criteria provided through the cognizant NASA Center CISO using Paraben E-Mail Examiner or similar software. The contractor shall store the index and all data meeting the requestor's criteria to appropriate removable media (CD-ROM, DVD, Thumb Drive, etc.) and provide the requested copies to the cognizant CISO for delivery to the requestor.

Data collection may need to occur after normal business hours when the subject and other area personnel are not present. HR requests will usually include analysis of data to identify and capture evidence of inappropriate use of NASA IT resources. OIG investigations will usually only require acquisition of data and providing acquired data to the OIG Computer Crimes Division for analysis and investigation.

DRD	Description	Frequency
DRD 44-4-6-1	E-Discovery results	As requested

Metric #	Description	Metric
Metric 44-4-6-1	All results of e-discovery are provided to the requestor by the agreed-upon due date	95% of e-discovery results are delivered by the agreed-upon due date

44.5 Security Operations Services

NASA operates a suite of cybersecurity tools and solutions, for use by individual organizations for mission-specific purposes, and at the enterprise level for use by all NASA security and IT professionals. In order to reduce duplication of effort, increase efficiencies, improve standardization of functionality and reporting, and achieve compliance with Federal mandates, NASA is increasingly consolidating its security solutions and the operation of such solutions. In support of these efforts, the contractor shall provide security operations services as described in the following sections of this PWS.

The activities considered part of security operations services will include assisting with transition into operations, operation of tools, change management and configuration management within the scope of normal operations as defined in concepts of operation and NASA procedures and governance processes, maintenance of hardware and software, technical field support (as needed), and decommissioning of

solutions at the end of their life cycle. However, security operations services will not include design and development of security solutions and tools, or changes which are outside of the scope of normal operations as defined by the relevant concept of operations.

44.5.1 Operation of Security Tools

Security tools and solutions assist NASA security professionals in performing their duties in all areas of security, including the Identify, Protect, Detect, Respond, and Recover functions of the NIST Cybersecurity Framework. Effective and efficient operation and maintenance of these tools is vital to effective security because such tools provide the information and capabilities needed for the identification, analysis and management of security issues, incidents and risks.

The contractor shall have the capability to operate and maintain a variety of security tools and solutions. Examples of such tools and solutions, which the contractor may be tasked to operate and maintain include, but are not limited to, the following:

- a. Intrusion Detection System(s)
- b. Intrusion Prevention System(s)
- c. Web security management solutions (proxy, Web content filtering)
- d. Tools provided under the DHS Continuous Diagnostics and Mitigation (CDM) program, e.g. nessus, IBM BigFix, IBM RES, or ForeScout
- e. NASA's Risk Information Security Compliance System (RISCS)
- f. Log aggregation and log management solution(s)
- g. Privacy and CUI Assessment Tool (PCAT)
- h. Firewalls

For each security tool operated and maintained by the contractor, as approved by NASA, the contractor shall:

- a. Replace and/or upgrade hardware as needed and ensure that system software is patched and maintained up to date in accordance with NASA requirements.
- b. Provide tool administration and configuration management in accordance with NASA policies, procedures and standards.
- c. Where applicable, ensure that deployed sensors and other system components are maintained in a fully operational state, are able to see the intended network traffic and/or system information, and are reporting and/or transmitting results appropriately.
- d. Ensure that the relevant signatures, rules, filters and configurations are up-to-date and configured in accordance with NASA guidance and requirements.
- e. Maintain, store and make available all data in accordance with NASA requirements.

The contractor shall also have the ability to operate and maintain Center- or organization-specific security solutions or capabilities as requested by NASA. To the extent that such organization-specific security solutions or capabilities are duplicative of existing NASA solutions, the contractor shall work with NASA and the specific organization to transition to the use of existing NASA solutions where appropriate. To the extent that such organization-specific security solutions or capabilities provide functionality that would be beneficial to other organizations or NASA as a whole, the contractor shall work with NASA to integrate such functionality into enterprise security solutions so that security across NASA may be improved.

An example of a Center- or organization-specific security solution is:

- a. A Center-developed custom tool for ingesting network vulnerability scanning information and patch monitoring system information for use by the network and security teams for the purposes of establishing connectivity blocks for those systems found to be non-compliant.

44.5.2 Technical Field Support

For all security tools and solutions operated and maintained by the contractor, the contractor shall provide operational and technical field support to maintain service performance requirements. Additionally, the contractor shall provide heightened operational and technical field support during Government-defined mission critical periods. This support shall include:

- a. Operate and maintain security solutions in accordance with performance specifications for those specific solutions.
- b. Perform remedial maintenance and ensure that the maintenance tools, spares, procedures, skills, and response times are adequate to meet performance metrics.

44.5.3 Maintenance

For all security tools and solutions operated by the contractor, the contractor shall maintain in a fully operational condition all equipment and software for those systems which the contractor has responsibility. In performance of this function, the contractor shall:

- a. Review and consolidate vendor hardware and software maintenance and license agreements, where possible, to achieve operational efficiencies and cost reductions.
- b. Compile and maintain a list of key contacts responsible for coordinating and conducting the required maintenance.
- c. Maintain up-to-date vendor documentation for all systems.
- d. Develop preventative maintenance schedules that minimize disruption.
- e. Coordinate the installation of software updates/releases/patches with NASA and customers, as required.
- f. Maintain all documentation, maintenance agreements, license information, maintenance, schedules, contact information, etc., NASA-approved repositories or systems.

DRD	Description	Frequency
DRD 44-5-3-1	Preventative maintenance schedules for security tools operated by the contractor	Annually or as requested

44.6 Identity, Credential & Access Management Services

Identity, Credential, and Access Management (ICAM) answers three key question regarding a person's identity and their logical and physical access to government assets:

- Who are you?
- How do you prove it?
- What can you access?

Identities, credentials, and access are managed in an integrated, enterprise environment at NASA to assure that people have the access they need to further the mission of NASA, without putting NASA assets at risk.

The contractor shall ensure that all activities within scope of this contract meet NASA and Federal ICAM requirements. The contractor shall support NASA HQ's compliance with the NASA ICAM program and processes.

Some examples of ICAM-related services the contractor may be asked to provide include, but are not limited to, the following:

- Support NASA's efforts to maintain accurate records of its employees and contractors in NASA's Identity Management and Account eXchange (IdMAX), the NASA Enterprise Directory (NED), and other authoritative Agency ICAM systems. The contractor may be requested to support data reconciliation, clean-up, or data maintenance activities.
- Support initiatives to improve and document NASA on-boarding and off-boarding processes for employees and/or contractors.
- Support for NASA projects and initiatives for credential management, e.g. transition Center employees from legacy PIV smartcards (NASA badges) to four-cert PIV smartcards.
- Validation of physical access authorizations.
- Support the development, modification, testing and troubleshooting of workflows in the NASA Account Management System (NAMS).
- Update and maintain NAMS workflow approvers and provisioners..
- Develop and produce reports of data from one or more of NASA's ICAM related tools and systems.
- Support integration of application authentication into NASA's authentication infrastructure.

- i. Support the management and operation of NASA's Public Key Infrastructure, e.g. perform the duties of Registration Authority..

DRD	Description	Frequency
DRD 44-6-1	ICAM reports	As requested

44.7 Security Consulting Services

Cybersecurity and information security capabilities must support NASA's business and mission activities throughout their lifecycle. NASA users, information system personnel, and organizations frequently need information about how to perform their work securely, how to interpret security policies, how changes to the environment affect the security of their information and system, etc. The contractor shall have the ability and security subject matter expertise by providing a wide variety of security consulting services.

In support of providing these services, the contractor shall:

- a. Maintain current skills and knowledge on cybersecurity, threats, vulnerabilities, technologies, and best practices.
- b. Maintain current skills and knowledge on NASA-supported hardware and operating system platforms.
- c. Maintain knowledge and awareness of Federal guidance and NASA policies and procedures.
- d. Maintain knowledge and awareness of the changing cybersecurity landscape, developments in the security solutions marketplace, and security implications associated with new, emerging and prevalent technologies, for example cloud services.
- e. Perform any security assessments or risk assessments and provide results to NASA requestors in accordance with NASA policies and with organizational procedures, as applicable.
- f. Develop reports, and recommendations to NASA customers as requested, using various media and techniques including briefings and tutorials.
- g. Provide recommendations and propose solutions which balance security risks against the mission/business needs of the requestor and the NASA HQ user community.

DRD	Description	Frequency
DRD 44-7-1	Security reports developed as part of security consulting services	As requested

44.7.1 Security Reviews

The contractor shall conduct security reviews, and develop reports of findings, for a variety of use cases, including but not limited to the following:

- a. As part of change management process, the contractor will perform security assessments and/or risk assessments of proposed changes to applications, information systems, cloud services, IT architecture or environment.
- b. As requested by NASA, the contractor shall conduct security assessments, code reviews and/or testing of NASA applications to identify security vulnerabilities and flaws.
- c. As requested by NASA, the contractor shall conduct security assessments of COTS, GOTS, or other software for the purpose of determining suitability for and risks of running the software in the NASA environment.
- d. The contractor shall evaluate security risks of proposed or implemented technical solutions to meet NASA customer needs, and provide recommendations on how identified security risks may be mitigated.
- e. The contractor shall evaluate proposed software updates and security patches for their efficacy in remediating or mitigating identified issues or flaws and to ensure that such updates do not cause unintended consequences or risks.

DRD	Description	Frequency
DRD 44-7-1-1	Security review reports (see DRD #44-3-1-1)	As requested

44.7.2 Security Requirements Development and Review

The contractor shall assist NASA customers in developing and documenting security requirements to address customer needs. The contractor shall review customer security requirements, as requested, for their effectiveness in achieving security objectives.

44.7.3 Security Control Selection and Tailoring Support

The contractor shall support NASA information system owners in the selection and tailoring of security controls appropriate to the information system and to the system's security objectives for confidentiality, integrity and availability, in accordance with NIST guidance and NASA policies and procedures.

44.7.4 Security Subject Matter Support

The contractor shall provide cybersecurity and information security subject matter expertise, as well as an understanding of NASA's IT environment and mission/business needs, in support of NASA project reviews, working groups, tiger teams and other forums.

44.8 Security Engineering services

NASA's IT infrastructure and mission IT environment, the overall threat landscape, and the IT and security marketplace are constantly changing, requiring NASA's cybersecurity program and solutions to keep pace in order to protect NASA's IT and information assets. The contractor shall support these efforts by providing security engineering services to NASA HQ, as described in the following sections of this PWS.

Providing these services effectively requires an in-depth understanding NASA's IT and security architecture, and the ability to capture requirements, evaluate options, and design and implement solutions to meet NASA needs.

In providing these services, the contractor shall:

- a. Follow NASA's program and project management requirements and processes, for example as defined in NASA policies and procedures or NASA organization-specific requirements and processes.
 - i. Work with NASA to tailor project documentation and review requirements for each project in accordance with NASA policies and procedures
 - ii. Develop all required project documentation and support required reviews and other project management requirements in accordance with NASA policies and procedures.
- b. Establish and maintain contact, as needed, with internal and external technical working groups to include IT and IT security professional associations, NASA Centers and component facilities, vendors, other Government agencies, and national/international industry organizations.

44.8.1 Development and Implementation of Security Tools and Solutions

The contractor shall have the ability, expertise and requisite knowledge of NASA's environment to develop and implement security tools and solutions to meet NASA requirements.

In developing and implementing security tools and solutions, the contractor shall:

- a. Conduct analysis, to include trade studies, feasibility studies, trend analyses, business cases, hypothetical investigations, benchmarks, and pricing
- b. Define requirements based on consultations with NASA stakeholders, best practices in security, and the contractors understanding of the NASA IT environment, enterprise architecture, and security architecture

- c. Determine possible solutions, including innovative options, and evaluate alternatives against the requirements
- d. Recommend tools/solutions to NASA.
- e. Design and develop new or modified security tools and solutions, as approved by NASA, which meet NASA requirements
 - i. Define preliminary and critical design, technical specification, review presentations, etc.
 - ii. Coordinate technical issues with vendors to resolve problems and/or make recommendations regarding system improvements/upgrades
 - iii. Evaluate, develop, and test prototypes of security solutions and tools, as needed, in coordination with NASA IT security management
- f. Conduct testing, including user acceptance testing, to ensure that tools and solutions meet NASA requirements
- g. Develop user documentation, as required
- h. Develop training materials and conduct training on new or updated tools and solutions to NASA stakeholders.
- i. Work with security operations personnel to transition implemented tools and solutions into operations
- j. Work with security operations personnel to decommission implemented tools and solutions at the end of their lifecycle, ensuring that records management and archival requirements are met
- k. Develop and communicate lessons learned during the lifecycle of security tools and solutions

DRD	Description	Frequency
DRD 44-8-1-1	User documentation of security tools	Prior to commencement of operations of the security tool, or as requested
DRD 44-8-1-2	Training materials on security tools	As requested

44.8.2 Development and Implementation of Security Processes, Methodologies, and Rule Sets

The contractor shall have the ability, expertise and requisite knowledge of HQ and NASA's environment to develop and implement security processes, methodologies, security metrics and rule sets to meet NASA requirements.

Examples of security processes, methodologies, and rule sets that the contractor may be tasked to develop and implement include, but are not limited to, the following:

- a. Development and implementation of a security monitoring
- b. Providing technical expertise and support to the Enterprise Security Technical Analysis Team (ESTAT) on behalf of HQ or organization
- c. Defining, developing and implementing additional continuous monitoring methodologies and tools as needed

- d. Developing and implementing security risk metrics in support of NASA's Agency Information Security Continuous Monitoring (ISCM) strategy and/or information system ISCM strategies
- e. ITSD Security Operations Governance (ISOG) processes
- f. Evaluation and testing of patches and configuration changes to remedy known security vulnerabilities

44.8.3 Evaluation of New Security Tools

The contractor shall support the continuous improvement of NASA cybersecurity and information security program by staying abreast of the security market and solution space, informing NASA of new capabilities, tools or solutions that may be of benefit to NASA. At NASA's request, the contractor shall perform testing and evaluations of new security solutions, or tools using a mutually agreed-upon methodology.

44.9 Security Data Analytics Services

A successful cybersecurity program depends on having accurate, up-to-date data about security threats, asset inventory and the current state of vulnerability, and on being able to analyze this data to gain actionable information. NASA has at its disposal vast, and increasing, amounts of security-relevant data, from many different sources, such as system and application logs, configuration data, network traffic, threat information, etc. In order to fully benefit from this data, NASA must be able to analyze it, identify risks, and develop meaningful and feasible corrective actions to continuously and pro-actively improve its cybersecurity posture.

The contractor shall perform security data analytics services in support of the HQ CISO and CIO, as described in the following sections of this PWS.

These data analytics services may include, for example:

- a. Configuring, fine-tuning and monitoring Security Information Management (SIM) or Security Information and Event Management (SIEM) solutions
 - b. Proactive monitoring of environment using data mining and other advanced data analytic techniques
 - c. Reviewing information in NASA's security repositories (such as ITSEC-EDW) to find patterns, trends, security vulnerabilities
 - d. Summary reporting (e.g. incident summary reports)
 - e. Trend analysis
 - f. Anomaly detection
 - g. Root cause analysis
 - h. Monitoring Network Trends
 - i. Monitoring system and network device behaviors to establish and maintain a baseline of normal patterns and trends for all networks
 - ii. Reporting network activities that diverge from normal network patterns or trends
 - i. Correlating data from multiple log sources to validate potential intrusions or assess system risk
- Examples of relevant log sources include:

- i. Centralized Log System
- ii. Patch Status Reporting System
- iii. Vulnerability Scanning System
- iv. Firewall Logs
- v. Full Packet Capture System
- vi. Web Content Filtering System

DRD	Description	Frequency
DRD 44-9-1	Reports of results of security data analyses	As requested

44.10 Security Assessment & Authorization Services

The Federal Information Security Modernization Act (FISMA) requires all Federal organizations to assure that information systems storing or processing Federal information are appropriately categorized and that the measures to secure them are adequate. The contractor shall have the ability to support a full range of Security Assessment and Authorization (SA&A) services, including all activities surrounding the selection, documentation and routine testing of security controls implemented in information systems, the continuous monitoring of system security posture, and the ongoing risk-based decisions to approve or deny the use of a system. These services also include oversight and tracking activities to ensure that information system personnel continue to manage Plans of Actions and Milestones (POA&M) and NASA information systems remain in compliance with all SA&A requirements.

The contractor shall perform security assessment and authorization services in support of the HQ CISO and CIO, as described in the following sections of this PWS.

44.10.1 SA&A Support for NASA Information System Owners

The contractor shall have the ability and requisite knowledge of NASA policies and Federal mandates and guidance to support all SA&A activities on behalf of NASA information system owners (ISO). In particular, the contractor shall have an in-depth understanding and knowledge of the National Institutes of Standards and Technology (NIST) Special Publications (SP) related to risk management, security controls and SA&A, as well as the requirements of the Federal Risk and Authorization Management Program (FedRAMP).

44.10.1.1 Data Categorization

The contractor shall assist NASA ISOs and data owners in categorizing NASA information and information systems in accordance with NASA policy and with Federal Information Processing Standard (FIPS) 199 and NIST SP 800-60.

44.10.1.2 Development and Maintenance of System Security Documentation

The contractor shall support NASA ISOs in the development and maintenance of information system security documentation. The contractor shall:

- a. Define system boundaries, system hardware/software inventories, system interconnections, system responsible officials, and system users
- b. Analyze the system and provide security control recommendations to the ISO in accordance with NASA policy and NIST SP 800-53
- c. Develop and maintain SA&A documentation for the system in accordance with NASA policy and Federal guidance
 - i. SA&A documentation may include, but is not limited to, System Security Plans (SSP), Risk Assessment Reports, Security Assessment Reports, Contingency Plans, Authorization to Operate (ATO) documents, etc.
 - ii. All documentation will be maintained in the NASA authoritative system for risk management and SA&A documentation (currently RISCs)
- d. Update SA&A documentation as changes occur affecting the security of a system

DRD	Description	Frequency
DRD 44-10-1-2-1	Information system security documentation, e.g. system security plans, contingency plans, etc.	Prior to NASA ATO for each information system, updated as required

44.10.1.3 Security Self-Assessment

The contractor shall support NASA ISOs in the initial and continuous assessment of system security controls as part of control implementation and continuous monitoring. The contractor shall have the requisite knowledge and expertise to conduct security controls assessment in accordance with NASA policies, NIST SP 800-53A, and FedRAMP.

44.10.1.4 Risk and POA&M Management

The contractor shall support NASA ISOs in the development, management, tracking, reporting and documentation, in the NASA authoritative system for risk management and security documentation, of a POA&M for all identified risks to the information system.

DRD	Description	Frequency
DRD 44-10-1-4-1	Information systems Plans of Actions & Milestones	Within 60 days of initial ATO for each information system; updated within 30 days of identification of

		new or modified risks, or at minimum annually
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44.10.1.5 Continuous Monitoring

The contractor shall support NASA ISOs in all activities surrounding continuous monitoring of the security of the information system. The contractor shall:

- Develop an ISCM strategy for the information system, in accordance with NASA policy, Federal guidance, the information system's specific risk environment, and the NASA Authorizing Official's (AO) identified risk tolerance
- Perform continuous monitoring of the information system in accordance with NASA policies, Federal guidance and the system's continuous monitoring strategy
- Ensure that the results of continuous monitoring are reported appropriately in NASA's authoritative system for risk management and SA&A documentation
- Ensure that continuous monitoring is an integrated component of risk management for the information system and that the results of continuous monitoring are used effectively and efficiently to drive updates to system security controls and SA&A documentation

DRD	Description	Frequency
DRD 44-10-1-5-1	Information system ISCM strategy	Within 60 days of initial ATO for each information system; updated annually or as requested

44.10.2 Assessment Services

The contractor shall perform independent assessment of system security controls, as requested by NASA, as part of the SA&A process or in support of other independent validation and verification requirements, and develop and provide security assessment reports (SAR) in accordance with NASA policies and procedures. The contractor shall have the requisite knowledge and expertise to conduct security controls assessment in accordance with NASA policies and NIST SP 800-53A.

DRD	Description	Frequency
DRD 44-10-2-1	Security Assessment Report	As requested

44.10.3 External System Support for NASA Information Owners

As part of NASA contracts, grants or other agreements, NASA information is frequently processed on behalf of NASA on contractor, or external, information systems. NASA external systems may be operated by other Federal agencies, contractors, universities, or other organizations external to NASA. The contractor shall support NASA information owners (IO) in meeting Federal and NASA requirements to ensure that NASA information is appropriately protected and that external information

systems are authorized to process NASA information in accordance with NASA policies and procedures.

The contractor shall:

- a. Support the NASA IO and accountable official (i.e. the NASA AO) in categorizing the system as well as defining the system boundaries, system hardware/software inventories, system interconnections, system responsible officials, and system users. The extent of involvement will be determined on a case-by-case basis.
- b. On behalf of the NASA IO, provide SA&A documentation support for the external system manager. The extent of support will be determined on a case-by-case basis.
- c. For certain external systems, for example for cloud-based systems, develop and maintain SA&A documentation for NASA-provide security controls.
- d. Conduct a security control assessment in accordance with NASA and Federal guidance and present findings, identified risks and risk recommendations, in the form of a risk assessment report (RAR) or SAR, to the NASA IO and AO.
- e. Work with the external system manager to ensure that continuous monitoring activities are conducted for the external system in support of ongoing authorization of the system.
- f. Support the NASA IO and AO in conducting authorization activities for external systems in accordance with Federal and NASA requirements.
- g. Ensure that external system SA&A documentation is appropriately entered and maintained in NASA's authoritative system for risk management and SA&A documentation.

Contractor personnel involved with external systems may be required to sign non-disclosure agreements prior to commencing any external system SA&A activities.

DRD	Description	Frequency
DRD 44-10-3-1	Information system security documentation for NASA-provided security controls for external systems. (see DRD #44-10-1-2-1)	As requested
DRD 44-10-3-2	Security Assessment Report or Risk Assessment Report (see DRD #44-10-2-1)	As requested

44.10.4 SA&A Oversight and Reporting Support

NASA Center CISOs and the Enterprise Services CISO are responsible for ensuring that all information systems under their purview comply with all NASA and Federal SA&A requirements, and for reporting

SA&A information to the NASA SAISO. The contractor shall support the HQ CISO, and potentially other Center/Enterprise Services CISOs through IDIQ task orders, in performing these oversight and reporting functions.

The contractor shall:

- a. Track all Center or organization information system SA&A packages and help ensure that they meet Federal and NASA SA&A requirements.
- b. As requested by the CISO, perform verification and validation of systems SA&A documentation and provide results and recommendations to the CISO and ISO.
- c. Ensure that information system POA&M activities are being conducted, managed and reported accurately and in accordance with established requirements and milestones.
- d. Coordinate or conduct, as appropriate for each system and its data categorization, authorization activities for all NASA information systems in accordance with NASA policies and Federal requirements.
- e. As requested by the CISO, periodically report status of all Center or organization information systems ATOs, POA&Ms, and other relevant SA&A information.
- f. As requested by NASA, provide guidance, and recommendations to Center or organization ISOs and other system personnel on all aspects of SA&A.

44.10.5 SA&A Oversight and Reporting Support for NASA SAISO

The NASA SAISO is responsible for ensuring compliance of all NASA information systems with NASA and Federal SA&A and continuous monitoring requirements, and for reporting compliance status to the Office of Management and Budget and Department of Homeland Security, in accordance with FISMA and other Federal mandates.

The NASA SAISO also determines NASA policies, procedures, and standards for the conduct of all SA&A activities and provides the NASA authoritative system for risk management and SA&A documentation.

The contractor may be requested, in the future, to support the NASA SAISO in performing these oversight and reporting functions through IDIQ task order(s). The contractor may be requested to:

- a. Track all NASA information system SA&A packages in the NASA authoritative system for risk management and SA&A documentation and help ensure that they meet Federal and NASA SA&A requirements.
- b. As requested by the SAISO, perform verification and validation of systems SA&A documentation and provide results and recommendations to the SAISO, Center/Enterprise Services CISO, and ISO.
- c. Support the NASA SAISO in performing all required reporting per FISMA and other Federal mandates and requests.

- d. As requested by NASA, provide guidance, and recommendations to NASA CISOs, Center or organization ISOs and other system personnel on all aspects of SA&A.
- e. Develop, maintain and document NASA common security controls and organizationally defined values (ODV) per NIST SP 00-53. Annually, or as required by NASA policy and Federal guidance, assess NASA common controls and ODVs to ensure that they operate as intended, remain effective, and are in compliance with current Federal guidance.
- f. Ensure that NASA common controls and ODVs are appropriately entered and maintained in the NASA authoritative system for risk management and SA&A documentation.
- g. Ensure that the necessary functionality, information and reporting is available in the NASA authoritative system for risk management and SA&A documentation to allow NASA personnel to meet all SA&A requirements.
- h. Provide guidance and support to NASA CISOs, ISOs and other information system personnel on the appropriate and effective use of the NASA authoritative system for risk management and SA&A documentation.

44.11 Security Governance Support Services

Security governance support services include a wide variety of activities that enable the success of NASA's cybersecurity and information security programs. The contractor shall provide security governance support services to NASA HQ as described in the following sections of this PWS.

44.11.1 Development and Maintenance of Policies, Procedures and Standards

As directed by NASA, the contractor shall develop, update, and maintain standards, policies and procedures on a broad range of security requirements and controls in accordance with Federal and NASA policies, requirements, and guidelines. Policy/procedure topics may include:

- a. Security controls defined in NIST SP 800-53;
- b. NASA-specific or organization-specific values, configuration, and processes for implementing security controls;
- c. NASA's ISCM strategy and related procedures or standards, for example, information security metrics and risk tolerances; and
- d. Any other requirements related to cybersecurity and information security.

In supporting this area the contractor shall:

- a. Participate in standards and forum boards to influence next generation standards, services, and technology direction.
- b. Ensure that all policies, procedures and standards documents are accurate, complete, professional, and tailored for audiences inclusive of non-security personnel

- c. Ensure that all policies and procedures are developed and maintained in accordance with NASA policy requirements.
- d. Solicit feedback from all necessary NASA stakeholders in the development of, updates and changes to policies, procedures and standards.
- e. Review and disposition all feedback from NASA stakeholders, in accordance with NASA processes and requirements.

DRD	Description	Frequency
DRD 44-11-1-1	Security standards, policies and procedures	As requested, updated at least every other year

44.11.2 Support of IT Security boards, working groups and Program Meetings

The contractor shall provide administrative and content support for NASA and organization cybersecurity and information security boards, security risk management boards, working groups, tiger teams, etc., as directed by NASA. Such activities may include weekly teleconferences, ViTS, Face-to-Face or other meetings of the NASA IT Security Management Board (ITSMB), the Enterprise Security Technical Assessment Team (ESTAT), and other security boards, groups and functions. The contractor support shall include, for example,

- a. Logistics support including arranging meeting space, preparing facilities, and running meetings
- b. Preparation of meeting agendas, minutes, and follow-on action tracking
- c. Development of presentations and other meeting materials
- d. Management of documents related to board or group activities using approved document management and/or collaboration tools

At the request of cognizant NASA officials, the contractor shall attend regularly scheduled or ad-hoc Agency working group meetings and periodic workshops and training related to cybersecurity and information security, including, but not limited to, network vulnerability scanning and monitoring, security configuration baseline maintenance and monitoring, implementation of enterprise security solutions, etc. The contractor shall contribute technical subject matter expertise to further the goals of the meetings. The contractor shall keep the requesting NASA official(s) informed of activities, issues and actions worked within such working groups and tiger teams.

DRD	Description	Frequency
DRD 44-11-2-1	Security meeting agendas, minutes, and action tracking	As requested

44.11.3 Support for Strategic and Tactical Planning

The contractor shall provide thought leadership and perform analysis and planning activities to assist NASA HQ in strategic and tactical planning to strengthen the cybersecurity and information security program. The contractor shall:

- a. Review and assess the future direction of developments in cybersecurity and information security to ensure security architectures, processes and solutions evolve to take advantage of new innovations, product releases, and advances in technology.
- b. Develop and document strategic/tactical plans for the cybersecurity and information security services and supporting systems. These plans will be consistent with NASA's Information Resource Management Strategy and relevant organizational strategies. These plans will establish the direction of change based on evolving requirements and technologies.
- c. Develop decisions packages (e.g. Capital Planning and Investment Control (CPIC), business cases) to support funding prioritization of projects and security infrastructure improvements resulting from the strategic planning efforts.

DRD	Description	Frequency
DRD 44-11-3-1	Cybersecurity/information security strategic and tactical plans	As requested
DRD 44-11-3-2	Decision packages in support of security strategic planning	As requested

44.11.4 FISMA and Compliance Reporting Services

In compliance with FISMA and other regulations, NASA is required to perform periodic reporting to Federal oversight agencies, such as the Office of Management and Budget or the Department of Homeland Security. The contractor shall provide support in completing such mandated reporting. As requested by NASA, the contractor may:

- a. Analyze reporting instructions to determine what information is required and draft a strategy, for NASA approval, for developing required reports
- b. Work with NASA stakeholders to collect the necessary information
- c. Analyze collected information, aggregate it as needed and develop reporting deliverables, for approval by NASA
- d. Submit reports via approved mechanisms

44.11.5 Audit Support Services

NASA's cybersecurity and information security programs are occasionally subject to audits, inspections and reviews from the NASA Office of Inspector General (OIG), the Government Accountability Office (GAO), the Office of Management and Budget, and other oversight organizations. The contractor shall provide support in responding to data calls and requests for information related to such audit activities, and in developing formal and information audit responses. For example, the contractor shall support the

development of exhibits, artifacts, and reports, the analysis of findings, and the tracking of corrective measures, as requested by NASA.

44.11.6 Supply Chain Risk Management

The contractor shall support NASA's compliance with Federal regulations on supply chain risk management. For example, the contractor may be requested to:

- a. Analyze planned or proposed purchases of hardware, software, and products and services, to ensure that they meet Federal and NASA requirements regarding country of origin, etc.
- b. Document and track approvals/disapprovals of purchases using NASA's supply chain risk management processes and tools.

44.12 Security Awareness and Training Services

Training is a vital ingredient for ensuring that NASA's entire workforce is aware of and able to meet cybersecurity and information security requirements and to appropriately protect NASA's information and IT assets.

The contractor shall support NASA HQ's cybersecurity and information security training efforts as described in the following sections of this PWS.

44.12.1 Security Training Content

The contractor may be requested to support the development, modification, review or procurement of training content for delivery to NASA personnel on a variety of cybersecurity and information security topics. This support may include the following:

- a. Finding, evaluating and recommending training material from external vendors;
- b. Supporting the development and presentation cybersecurity and sensitive unclassified information awareness training; and
- c. Supporting the production of NASA's information/cyber security awareness month programs and activities.
- d. Reviewing and providing feedback to newly developed cybersecurity or information security-related training modules.

44.12.2 Delivery of Training

The contractor shall support the delivery of training content on cybersecurity and information security, for example, through in-person classroom training, online classes, or other security awareness events. The contractor shall support communication to NASA personnel about cybersecurity and information security training events or classes sponsored or provided by the NASA IT Security Awareness and Training Center, other NASA organizations, affiliates and external partners.

44.12.4 Compliance tracking

NASA employees and contractors are required to complete annual cybersecurity and information security awareness training, as well as other periodic or ad-hoc training related to security. The contractor shall support the tracking and reporting of compliance with such training requirements, as requested by NASA. These activities may include analysis of training requirements, reconciliation of training records with other NASA data sources, and status reporting to NASA organizational POCs, users and management.

DRD	Description	Frequency
DRD 44-12-4-1	Status reports on compliance with cybersecurity/information security training requirements	As requested

44.13 Information Security Support Services

Information security encompasses all activities associated with the appropriate management and protection of NASA sensitive information and privacy information.

The contractor shall have the necessary subject matter expertise and experience with applicable information protection, information management and privacy regulations and Federal guidance (including, but not limited to, the Privacy Act of 1974, the Children's Online Privacy Protection Act of 1998, and the Paperwork Reduction Act of 1995) to provide information security support services as described in the following sections of this PWS.

The contractor shall perform information security support services in support of the HQ CISO, Center Privacy Manager (CPM) and CIO, as described in the following sections of this PWS.

44.13.1 Privacy Support

The contractor shall support NASA's compliance with Federal regulations and guidance on privacy, and information management. For example, the contractor shall:

- Provide subject matter expertise, support, and recommendations to NASA organizations for understanding and meeting the privacy and information management requirements for information collections.
- Assist NASA organizations in understanding and interpreting NASA policy and procedures relative to privacy.
- Support NASA organizations in documenting information collections in NASA's Privacy and CUI Assessment Tool (PCAT) and ensuring that all PCAT-related requirements are completed for collections.

- d. Support the HQ Privacy Manager in ensuring compliance of NASA information collections with all Federal regulations and NASA policies.
- e. Support the HQ Center Privacy Manager in completing annual, periodic, or ad-hoc required actions related to privacy, including, but not limited to, review and reduction of collection of social security numbers, FISMA reporting, etc.
- f. Develop and update NASA policies, procedures and guidance related to privacy.

DRD	Description	Frequency
DRD 44-13-1-1	Privacy policies and procedures (see DRD #44-11-1-1)	As requested, updated at least every other year

44.13.2 Privacy Breach Management

The contractor shall support the reporting, investigation, analysis, and remediation of breaches of NASA privacy information, in accordance with Federal regulations and NASA policies and procedures. The contractor shall provide administrative and subject matter support to NASA Breach Response Teams (BRT), which may be convened to support the management of a privacy breach. The contractor shall coordinate privacy breach management activities with the HQ Privacy Manager(s), the NASA Agency Privacy Program Manager, the NASA SOC and Center or organization Incident Response Teams as required.

44.13.3 Support for Protection of Sensitive NASA Information

The contractor shall support NASA compliance with Federal guidance on protecting sensitive information, also known as Controlled Unclassified Information (CUI) or Sensitive but Unclassified (SBU) information. For example, the contractor may be requested to:

- a. Develop and update NASA policies and procedures
- b. Recommend appropriate protection mechanisms for sensitive NASA information
- c. Developing and produce reports related to protection of sensitive information

DRD	Description	Frequency
DRD 44-13-3-1	Sensitive information protection policies and procedures (see DRD #44-11-1-1)	As requested, updated at least every other year

44.13.4 Compliance with Regulatory Requirements

The contractor shall support NASA compliance with regulatory requirements, for example, related to the Paperwork Reduction Act of 1995, by providing subject matter expertise in helping NASA organizations to understand and meet the requirements.

45.0 Emergency Preparedness Planning and Support

NPR 1040.1, NASA Continuity of Operations (COOP) Planning and Procedural Requirements, and NPR 2810.1 define key responsibilities related to Centers' and organizations' Continuity of Operations (COOP), including requirements for planning, preparation and implementation of contingency operations. The contractor shall support NASA in

- a. Planning for and conducting emergency operations during a contingency event; and
- b. After a contingency event, ensuring that operations of required information systems, services and facilities (including computers, networks, applications, data repositories, telecommunications, environmental, and technical support) can be resumed within required business timeframes.

45.1 Continuity of Operations planning and preparation

The contractor shall:

- a. Develop and maintain up-to-date COOP plans, procedures and processes to mitigate the impact of a disaster or major failure in accordance with NASA policies and procedures and Federal guidance. Plans, procedures, and processes include Business Continuity Plans, IT Contingency Plans, and Disaster Recovery Plans, Information System Contingency Plans, etc., as needed:
 - i. Such plans shall be developed in coordination with NASA and other contractors providing IT and other support to NASA Centers and organizations.
- b. At least annually, train COOP personnel on all plans, procedures and processes.
- c. Develop and implement annual exercises and/or test of all COOP plans, procedures and processes.
 - i. After each exercise or test of a COOP plan, process or procedures, develop an after-action report including lessons learned and recommendations for improvement
- d. Use after-action reports, as needed, to improve the relevant COOP plans, processes or procedures.

- e. As requested by NASA, analyze and provide comments and suggestions to NASA on the COOP planning for information systems operated by other Federal agencies and by commercial suppliers who provide services to NASA
- f. Coordinate with information system personnel and disaster recovery experts across NASA and NASA's partners to ensure and verify integration of COOP procedures and planning techniques
- g. Support NASA in analyzing and providing comments and suggestions on the disaster recovery and continuity planning for systems operated by other Federal agencies and by commercial suppliers who provide services to NASA
- h. Support NASA in Agency-wide emergency preparedness and continuity of operations planning (COOP).

DRD	Description	Frequency
DRD 45-1-1	IT Contingency Plan update, Training and Exercise/Test	Annually by the end of the Fiscal Year
DRD 45-1-2	HQ ITCD Business Continuity Plan update, Training and Exercise/Test	Annually by the NASA HQ deadline (usually mid-April)
DRD 45-1-3	After-action report for COOP exercises or tests	As needed, within 60 days of completion of each exercise or test

45.2 Emergency Operation Center and Continuity of Operations support

The NASA HQ Emergency Operation Center (EOC), located at 300 E St SW, consists of workstations, printers, monitors, public address system(s) and network connections. In an emergency, EOC personnel meet in the room to plan, coordinate and implement necessary actions. Emergency exercises are conducted in the EOC on a regular basis. The contractor shall provide IT support for the EOC when needed during exercises and during real emergencies. The contractor shall recommend improvements after each exercise and shall implement improvements only after receiving approval by the COR or designee.

In addition to the EOC room, NASA HQ maintains COOP sites at Goddard Space Flight Center, Langley Research Center, and the Glenn Space Center. If NASA HQ becomes inaccessible or as directed, essential Agency leadership personnel will utilize one or more of these sites. Testing of these COOP sites is conducted on a regular basis. The contractor shall support the maintenance, testing and activation of the alternate operating facilities.

46.0 Reserved

47.0 COMSEC Support

The contractor shall provide COMSEC support and services to NASA HQ, acting as the HQ COMSEC Account Manager (CAM). Contractor COMSEC personnel shall possess and maintain a current TS/SCI level clearance preferably adjudicated within the last 36 months. The contractor shall:

- a. Obtain, purchase, receive, safeguard, issue, provision accounting for, ship, and destroy (as required) all COMSEC material and equipment within the NASA HQ COMSEC account in accordance with Federal and NASA regulations and guidelines
- b. Install COMSEC equipment, software, and keying material; troubleshoot COMSEC related user, equipment, and software problems; and conduct COMSEC user training and security briefings
- c. Conduct HQ-wide COMSEC inspections, audits and inventories consistent with National and NASA COMSEC policy and provide reports to the cognizant ITCD official
- d. Maintain currency and proficiency on National and NASA COMSEC policies and secure communications equipment
- e. Coordinate with the NASA COMSEC Office of Record (COR) on COMSEC matters in support of the COMSEC function
- f. Ensure availability of services within an agreed-to schedule
- g. Ensure a secure work environment, including restricting unauthorized access to the CAM's material or work area
- h. Attend required training, Agency COMSEC working group meetings and similar authorized COMSEC events
- i. Participate in the development of HQ COMSEC tactical, strategic and budget planning
- j. Provide excellent customer service for a variety of COMSEC products and functional areas
- k. Support and execute COMSEC deployment initiatives as requested by NASA, for example, during changes of COMSEC equipment and/or network infrastructure.

DRD	Description	Frequency
DRD 47-0-1	Quarterly Metric Report summarizing the transaction history, incidents, and inventories/inspections for that report	Due 90 days from contract start, and every 3 months thereafter

Metric #	Description	Metric
Metric 47-0-1	COMSEC equipment and material records are shown to be accurate during COMSEC inspections, audits and inventories	100% accuracy of all inventory records

48.0 Scientific and Technical Information Program Support Services

NASA's Scientific and Technical Information (STI) Program is governed by the NASA STI Program

Office (STIPO) at Langley Research Center (LaRC). NASA's STI program is essential to help NASA avoid duplication of research by sharing information and to ensure that the U.S. maintains its preeminence in aerospace-related industries and education. The NASA HQ STI program is a critical component in the Agency's worldwide activity of scientific and technical aerospace research and development.

NASA HQ uses the Agency's electronic document availability authority (eDAA) system to obtain review and approval for the public dissemination of its STI content. STI available to the public is maintained within the NASA Technical Reports Server (NTRS). The NTRS is a world-class collection of NASA STI that includes over four million bibliographic records and a growing number of full-text documents. The NASA STI program acquires, processes, archives, announces, and disseminates NASA STI.

The contractor shall:

- a. Adhere to NASA policies and procedures for the processing of STI.
- b. Learn to use the automated eDAA processing system in order to run, analysis and reconcile report data.
- c. Respond to and address data discrepancies related to STI documents and products which have been identified by NASA STIPO and audit entities.
- d. Submit STI requests within the eDAA system on behalf of HQ and STIPO to ensure appropriate Center review and approval to discern STI restrictions or approval for public release.
- e. Attend teleconferences to maintain an understanding of current and planned STI processes and requirements, including STIPO's Change Management Board (CMB) meetings.
- f. As requested by NASA, attend the annual STIPO Face-to-Face meeting, which may require travel within the United States.
- g. Provide routine reports to HQ DAA regarding completed work assignments.
- h. Participate in the planning and strategizing of STI assigned workload.
- i. Arrange and host eDAA training sessions.
- j. Complete deliverables to address HQ and STIPO specific STI data calls using spreadsheets, word processing, and presentation applications.
- k. Conduct STI eDAA system administration duties to ensure the system is properly configured to route to appropriate approvers for submitted STI DAA requests.

DRD	Description	Frequency
DRD 48-0-1	Respond to ITCD, STIPO and audit inquiries	Ongoing
DRD 48-0-2	STI reconciliation and tracking reports	Ongoing
DRD 48-0-3	STI support progress reports	Weekly, or as requested

Metric #	Description	Metric
Metric 48-0-1	Reconciliation of STIPO audit findings	95% of audit findings are resolved within 90 days of receipt

49.0 Other Support Tasks (Non-Core Support)

This PWS represents a comprehensive set of core requirements that are provided to all HQ offices. Other program or organizational unique related services may be required during the life of the contract to provide direct support to Administrator Staff Offices, Mission Directorates, Mission Support Directorate and offices at other NASA centers. These other services will be ordered through the indefinite delivery, indefinite quantity provisions of the contract. Several examples of task orders include the following:

- Support the investigation and deployment of state-of-the-art and leading edge technologies for the Exploration Systems Management Directorate. Support to this task has a Research and Development component that complements Headquarters core IT services by demonstrating, exploring, and exploiting new technologies within both development and production environments.
- Support the Exploration Systems Management Directorate in the planning, design, analysis, development, implementation, and training support to the Integrated Collaborative Environment (ICE) project.
- Support the Science Mission Directorate (SMD) through the enhancement of SMD business systems and processes placing emphasis on integration, collaborative solutions, knowledge management, and communications technologies. In addition, develop, maintain, and document the SMD IT architecture as it relates to the Agency IT architecture and to any locations hosting SMD servers/applications.
- Support the daily operations and strategic planning for the HQ Space Operations Center (SOC). Activities include demonstrations, training, on-site support, operation of desktop, web-based and other advanced applications and products.
- Support the Office of the Chief Financial Officer by maintaining the Central Resource Control System, NASA Audit Tracking System, CFO Web Site Portal, and Financial Management Internal Control System.
- Support the Office of Public Affairs (OPA) to include application development, IT strategic guidance, technical support and maintenance, test-bed provisioning, recommendations of software and hardware, multimedia support, and research and development support.
- Support the Agency Chief Information Officer and other NASA Centers with expert level consultation, recommendations and support on Security Program Management, Governance and Oversight, Security Operations and Security Architecture and Engineering. In addition, provide program management support for each of the Program Managers in the OCIO, including Architecture and Integration, IT Security, Enterprise Portfolio Management, and Policy and Investment; eGovernment Initiatives support; Application Portfolio Management support throughout the Agency; and Agency Business Systems Support.

